AMATEUR RADIO

Vol 53, No 1, January 1985

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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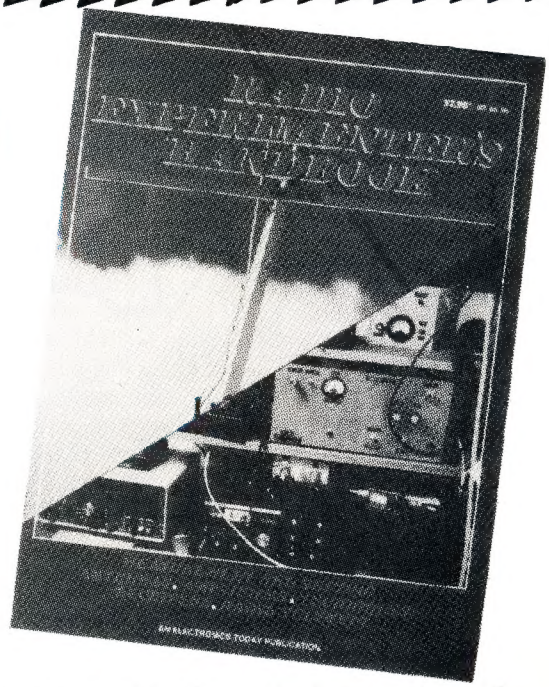

The **Radio Experimenter's Handbook**, Volume 1, from Electronics Today International is 132 pages chock-full of circuits, projects to build, antennas to erect, hints and tips. It covers the field from DX listening to building radioteletype gear, from 'twilight zone' DX to VHF power amplifiers, from building a radio FAX picture decoder to designing loaded and trap dipoles.

eti

Edited by Roger Harrison, VK2ZTB, this book carries a wealth of practical, down-to-earth information useful to anyone interested in the art and science of radio. $7.95 from your newsagent or through selected electronics suppliers. It is also available by mail order through **ETI Book Sales, P.O. Box 227, Waterloo NSW 2017** (please add $1.75 post and handling when ordering by mail).

The feature of the cover for January is the Seventy Fifth Anniversary Logo. This logo will feature on the cover of each magazine this year.

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AMATEUR RADIO

Published monthly as the official journal by the Wireless Institute of Australia, founded 1910. ISSN 0002 — 6859. Registered Office: 3/105 Hawthorn Road, Caulfield North, Vic. 3161. Telephone: (03) 528 5962.

This magazine is the first issue in this, the WIA's anniversary year, and the cover features the logo, which was devised from a design submitted by Don VK3DLV, in the Logo Competition last year. This logo will become familiar to all readers during the year.

The logo will feature on AR each month and will also feature on T-shirts, keyrings, pennants and self-adhesive labels which will be available to members. Members will find five complimentary labels included with their magazine this month.

Also included with your AR this month is a Planner Calendar which has some events and contests listed which were available at the time of printing. During the year it is anticipated to include updated information for marking in on the calendar.

The Main QSP, p5, also lists some of the exciting activities that will be happening during the 75th Anniversary.

Late last year Bill Hempel VK4LC accepted the position of Federal Awards Manager. Best wishes to you Bill. All applications for Australian Awards may now be sent to Bill at Southport Avenue, Eagle Heights, Qld 4271.

The rules for the 1985 John Moyle Field Day Contest will be printed next month. Read them carefully so you may note the change of date.

For members interested in RTTY-Morse, check out the feature technical article which begins on page 16. It has a full size PCB layout, circuits and computer programme which will relieve you of the 'old clanking Baudot machine'.

Historically, do you know the origin of 73? Max VK3ZS explains this on page 13. Max hopes to re-kindle some history during the year with some further articles about the past.

Further to the history of the Institute is a reprinted article about how the WIA came into being — see page 6. It is a very informative article, originally published in Monitor.

As there are no Ionospheric Predictions due to early publishing dates, Len VK3BYE has written a very informative article about the 'Sunspots' and their effect on propagation — page 55.

BPK

DEADLINE

All copy for March AR must arrive at PO Box 300, Caulfield South, Vic 3162, at the latest by midday 23rd January 1985.

★ Cartoons in this issue by Bill Martin VK2EBM

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Material should be sent direct to **PO Box 300, Caulfield South, Vic 3162**, by the **25th of the second month preceding publication. Note: Some months are a few days earlier due to the way the days fall. Phone: (03) 528 5962**
Hamads should be sent direct to same address.
Acknowledgement may not be made unless specially requested. All important items should be sent by certified mail. The editor reserves the right to edit all material, including letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

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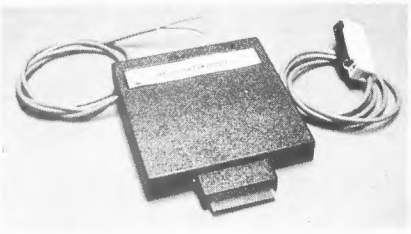

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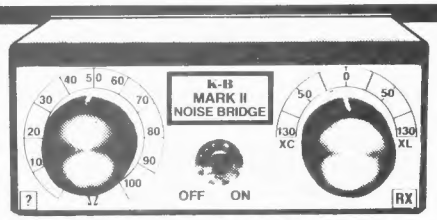

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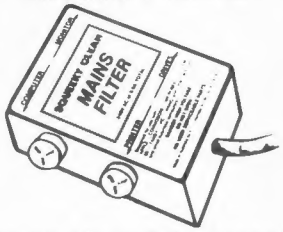

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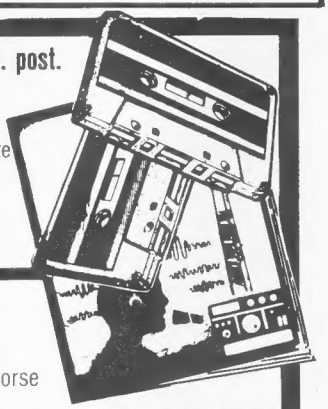

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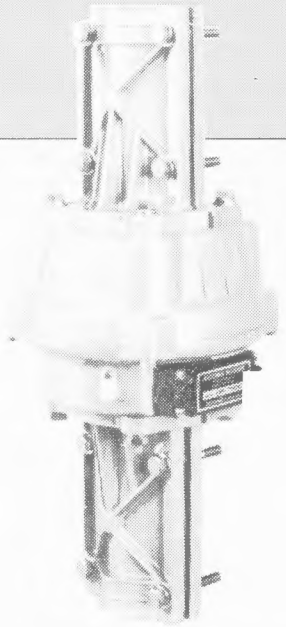

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a word from your EDITOR

A PROUD HISTORY

Welcome to the first month of the 75th Anniversary Year of the Wireless Institute of Australia. Those few enthusiasts, with their spark transmitters and coherers, laying in March 1910 in Sydney the foundations of the organisation which became the WIA, could not possibly have foretold how it would develop in 75 years. But because of their foresight we are the oldest amateur radio society in the world, while the great interest which unites us all has evolved into a means of international understanding which has no equal.

In 1910 those early pioneers envisaged the possibility of communicating with each other by Morse code over distances of only a few miles. Marconi had shown in 1901 that it was possible to span the Atlantic, but few of the other early amateurs could aspire to building or owning equipment as large and powerful as his. It was not until 1921 that amateurs, as we now understand the word, succeeded in repeating Marconi's feat. Another three years passed before amateur contacts were made from Australia to USA and England.

The amateur movement has grown tremendously since those early days. There are now licensed amateurs in virtually every country of the world, and their total is approaching one million. The technology has evolved over the years, with individual amateurs contributing at almost every step, until it is now feasible that any one of that million should be able to make contact on amateur frequencies with any other! Admittedly not all at the same time, but, as our use of satellites develops, even this may be possible.

More than any other interest with participants all over the world, amateur radio has the ability to bring people together. Such things as politics and religion are often divisive. This is why they may not, as a rule, be discussed on the amateur bands. Yet a common interest in radio not only unites us but provides the means whereby it can develop further. Amateur procedure (particularly on CW) can even go far towards bridging the barriers of language. And differences in rank or status traditionally play no part in our communications.

The evolution of this world-wide egalitarian fraternity did not occur by accident. It was made possible by the ingenuity of individuals and the negotiations of their societies with governments. Our own society, the WIA, has played no small part in this. We may justifiably be proud of our achievements, but we still have a long way to go. Our strength as an organisation will determine how effectively we can advance into the next 75 years. Every Australian amateur who joins the WIA helps add to that strength. All of us, already in the Institute, have a duty to recruit new members, to enhance still further our credibility as the voice of Australian amateurs. This is the message of our 75th anniversary. It challenges each of us to do even better from now into the next 75 years and beyond. *Let's go and do it!*

Bill Rice VK3ABP
Editor
AR

THUMBNAIL SKETCHES

Alan Shawsmith, VK4SS
35 Whynot Street, West End, Qld 4101

ROY P JONASSON — VK4NE (ex VK4NG)

This OOTer passed his AOCP in 1928 but, because of the great economic depression in Australia, it was 1931 before Roy could spare the cash to put himself on air on QRPp. Being fortunate enough to have a property at "Ageston" at the mouth of the Logan River overlooking the wide expanse of Moreton Bay, DX was a piece of cake. It would appear that Roy could be the holder of a couple of pre-WW11 QRPp records; they have never been officially recorded, simply because he's not the type to talk about them.

In 1932 he QSOd ZL4DT in Balclutha, South Island of New Zealand (the op incidentally was YL Kath Kirby). This was on 40 metres, using a receiver-type 201A valve Hartley oscillator driven from a car accumulator and 'B'+ batteries of approx 150 volts. The mode was loop modulation phone; input four-fifths of one watt or about .2 watt in the aerial. Report received QSA 3, R 4-5.

Prior to this a contact was made with the USA using a 3 watt SPARK transmitter. This rig was made up of an old Ford T model coil and driven by a car battery and vibrator and fed into the antenna via a spark gap. Roy was probably not the *first-ever* VK4 to work into W-land but quite likely the *first* to do it on QRPp, ie less than five watts DC input. The antenna for both these record-making QSO's was a 132 feet flat top end fed Zepp up 66 feet. As proof of the ideal QTH at Ageston, it was possible to hear both 2BL and 3LO nightly on a crystal set.

In 1935 Roy VK4NG played a big part in rebuilding and operating the official station of the Queensland Listeners League VK4QL which was situated in Paddington, close to the City of Brisbane. This station operated on approx 206 metres. Roy obtained raw quartz crystal directly from Mt Isa Mines, Queensland — this was claimed to be the first time such active mineral from an Australian source was used for electronic purposes. The quartz was cut and ground in Brisbane by a professional gem cutter who also had an interest in wireless. The finished product was forwarded to Mr Armstrong, O/C Radio Inspectors Dept, who found it to be spot on frequency, ie 206 metres — not bad for those using homebrew measuring equipment.

Roy moved to the Apple Isle in 1935 and took the call VK7NG; the year 1938 saw him signing VK3ND. After this, he went north to New Guinea and used VK9DP to attract the DX, then back to VK3 and finally retiring in the Sunshine State at Kingston less than thirty kilometres from whence he started out as VK4NG, over a half century earlier.

His working condition now includes an FT101Z; he homebrewed his equipment until 1970, which is longer than most. VK4NG joined the WIA and RAAF Wireless Reserve in 1929 and was also a member of the QRP Club of Gisborne, New Zealand. Long may he remain active and enjoy his memories.

Unfortunately we only have a photocopy of a photo of Roy which will not reproduce in the magazine printing process.
AR

OUR EMBLEM IS NOW STANDARDISED

The WIA emblem is believed to have been designed around 1920-21 with the wings and lightning motif derived from an Army Wireless Unit badge of World War 1.

Until now the emblem has been in a state of virtual constant change — but appropriately this stops in the Institute's 75th year.

At last year's Federal Convention, motion 84.10.01 proposed by VK3 and seconded VK2 said that: *"The Institute adopt for its 75th anniversary a winged emblem closer to the roots of the organisation such as appears on the 1980 Australian Callbook cover and the majority of WIA certificates."*

The proposer's comments were: *"The emblem is part of the Institute's heritage and has been drawn differently so many times that a number of versions are unfortunately in use throughout Australia."*

The comments continued to point out differences in various versions, including the wording, scroll, wings and lightning motif. Many of the variations are subtle, while some are quite obvious even to the untrained eye.

The Divisions were unanimous in support of 84.10.01 which has resulted in the standardised emblem shown here.

Admittedly it will take some time to phase out the use of non-standard emblems. But each Division aims to do this on its stationery and by encouraging members to use only the standard emblem on their QSLs.

The emblem is also a focal point of the WIA 75th logo — copies of which are inserted in this month's AR for use by members.

Contributed by Jim Linton VK3PC
AR

QSP

75th ANNIVERSARY OF THE WIRELESS INSTITUTE OF AUSTRALIA

Members should now be well aware that 1985 is the 75th Anniversary Year of the Oldest Radio Society in the World.

This news item is intended to inform all members of the plans made to celebrate this Anniversary Year. Some items are firm and others have yet to be finalised.

THE 1985 EVENT CALENDAR

The 1985 Event Calendar included in this issue, shows as many firm dates as was possible to include at the time of printing. As the year proceeds *"dates for your calendar"* will appear in "Amateur Radio" to allow you to update your event calendar.

75th LOGO

Each member has received, in this issue, some self adhesive 75th Logo Stickers. The intent for these are for members to use them on QSL cards, etc, going overseas, or to anywhere you consider it desirable to publicise the 75th Anniversary Year. Contact your divisional offices for further supplies.

75th AWARD

The rules for this event will be published separately (elsewhere in this issue) but suffice to say, at this time, that the award will open on the anniversary of the founding day 10 March and will close on 31 December 1985. The certificate itself will be of a high standard and even if you are not a regular entrant into contests or an awards buff, this special award will be worth the effort to obtain.

VK FOX HUNT CHAMPIONSHIP

The finals of this event will take place during October 1985, details of this event are yet to be finalised, further information will be published in later issues of AR.

RTTY ART CONTEST

The VK3 Division have this contest well under way, refer to page 28 of November AR.

CW CONTEST

During this year the VK2 Division will be running a CW Contest to further the ability of Morse knowledge, practice and skill amongst full calls, novices and "K" calls.

The dates and rules will be published in later issues of AR.

VK/ZL CONTEST

The VK/ZL Contest Manager will be making every effort to ensure that the VK winner will be known before the end of 1985, it is hoped that a suitable prize to commemorate the 75th Anniversary will be obtained. More about that at a later date.

PRE-STAMPED ENVELOPE

On 22nd May 1985 Australia Post will be releasing a pre-stamped envelope to celebrate the Institute's 75th Anniversary. At the time of writing the design is almost completed.

Displays of radio activities will take place in many post offices to co-incide with the launch of this envelope.

WORLD AMATEUR RADIO DAY, 18th APRIL 1985

This day is proposed as an activity day for the little used 10, 18, 24MHz bands. All members are requested to come up on these bands during WARD. *(The old adage still applies "use or lose").*

DO YOU OWN A PIECE OF HISTORY?

We are seeking the oldest working (authenticated) item of amateur radio equipment, send brief details, with a photograph to your divisional offices. During 1985 the responses to this will be published in AR. *(We realise that some old timers may be reticent in coming forward, so if you know of an interesting item have a chinwag with the owner).*

ARE YOU A PIECE OF HISTORY OR ARE YOU AWARE OF AN AMATEUR WHO COULD POSSIBLY BE?

(1) We are seeking the licensed amateur who has been active longest.

(2) We are also seeking the longest serving member. Send brief details of either to the Secretary at the Federal Office *(Again we realise that some old timers may need to be helped, so if you can do so.)* Some form of vertification is required in both cases.

FEDERAL 75th ANNIVERSARY DINNER

A formal dinner will be held in Melbourne at the Southern Cross Hotel on 9th November 1985. With many dignitaries attending, included will be all the members of the IARU Administrative Council, who will be in Melbourne for their council meeting and officers of the institute. A limited number of tickets will be available to members at an approximate cost of $40 per person. *(Apply in writing with your cheque to the Federal Secretary).*

REGALIA

To celebrate the 75th Anniversary the Executive Sub-Committee, tasked to co-ordinate this year, have commissioned several items of regalia for members.

WIA ties, WIA tee shirts (with two styles, either 75th or WIA Motif), WIA pennants, WIA keyrings.

These items will be available from your divisional offices in March 1985.

MEMBERSHIP DURING 1985

(1) Each 75th new member receive, from the Federal Office, a presentation clock for their shacks.

(2) Each 75th renewal before the cut off date ie: 21.2.85 will receive a small gift pack and will be placed in a draw for a clock.

(3) Each proposer of a new member will receive a small gift to recognise his/her efforts. *(exceptions are of course as usual, executive office staff etc).*

(4) For 1985 a specially prepared limited edition Membership Certificate will be issued to new members.

The decision regarding 1 and 2 will be computer controlled and no correspondence will be entered into.

The presentation clocks are "Citizen Quartz", which, amongst other features, have dual time zones and temperature readouts. The normal retail price of these clocks is $60.

We hope that you all enjoy participating in the events planned, proposed and yet to be announced. Please do what you can to publicise this Anniversary Year whenever you have the opportunity.

AR

Many amateurs and WIA members may not know how our existence came about, and the close relationship which exists between the Wireless Institute of Australia and the Institution of Radio and Electronics Engineers Australia (IREE).

In the early days of the formulation of our hobby and the WIA, both groups were in fact one, but its members had slightly different spheres of interest.

The following article was published in the IREE's Journal 'MONITOR' in December 1982, and is republished in AR by arrangement.

Regretfully the author H Murray Tyler passed away prior to seeing his work published.

THE BEGINNING OF IREE — HOW IT ALL CAME ABOUT

by the late H Murray Tyler, FIREE

The following historical document was carefully researched and written by the late H Murray Tyler, FIREE — a Foundation Member of The Institution of Radio and Electronics Engineers Australia — for many months prior to his death earlier this year, who was looking forward to having it published in this Jubilee Issue of MONITOR. We deeply regret he was not able to see its final publication.

Murray was well known to many members of The Institution in his home State of New South Wales and elsewhere throughout Australia. We are sure that this article will bring recollections of Murray Tyler himself as well as the early days of The Institution to many of our members.

The Institution of Radio Electronics Engineers, Australia, celebrating in 1982 what superficially appears to be its 50th birthday, is really a very much older body which, although passing through a series of name changes, has had a continuous existence since March, 1910. This article tells the story of why and how it all came about, and why it can claim to have its beginnings as the first technical radio association in the British Empire.

FIRST MEETING

Marconi had spanned the Atlantic with a wireless signal only nine years earlier when a group of technically-minded wireless experimenters, in Sydney, headed by George A Taylor, met at the Australia Hotel on 11th March, 1910, to found a body named "Institute of Wireless Telegraphy of Australia".

The glamour of wireless communication had gripped the imagination of wireless enthusiasts throughout the world. This wonderful new device proved an irresistible area of experiment for any who had a leaning towards technical matters.

HOOKED ON "WIRELESS"

They were hooked — they had to be in it. The leader of such a group in Sydney, George A Taylor, was a very remarkable man indeed, who lived an unbelievably exciting life. Commencing as an artist, he became interested in aviation and collaborated with Lawrence Hargraves in his early flights. He later established at Redfern the first aeroplane factory in the Southern Hemisphere, and, in 1909, he flew the first heavier-than-air machine built in Australia. Taylor also founded, in 1909 the Aerial League of Australia, and his wife Florence became the first woman in Australia to fly a plane. From such beginnings, however, he devoted his life to radio and to publishing. If it was technical and new, Taylor had to be in it, and he had to tell the world all about it.

In moving that a Wireless Institute of Australia be founded, he said:

"Investigators were today on the verge of an arena of wonder. They are like explorers in a strange country, where every step is a discovery, but as success could only be achieved after many failures, there was need of mutual co-operation between investigators to avoid making the same mistakes, and to climb together wherever any successful discovery would be achieved. The time was approaching when this age would not again have the stigma of a 'Waratah' going into the unknown without a wireless connecting link. There was further necessity for the formation of the Institute to protect legitimate experimenters."*

The first Council consisted of George A Taylor, Major Fitzmaurice, Capt Cox-Taylor, Dr Brissenden, Messrs Hannam, Pike, Bartholomew, Gosche, F Leverrier and H Leverrier, A Garnsey, F Cleary. All were well-known radio experimenters. Pike and Hannam had both been reported by the Sydney Morning Herald, a few weeks earlier, as receiving signals in Sydney from warships in the vicinity of Melbourne and Auckland, and that same paper was reporting plans of the Commonwealth Government to establish two wireless stations in Australia — one near Sydney and the other near Fremantle.

MARCONI SPONSOR

And so, radio had its beginnings in Australia. The Institute of Wireless Telegraphy of Australia was soundly established, and Guglielmo Marconi was delighted to grant his sponsorship to this unique body.

The Institute grew in numbers and influence as the intricacies of this latest wonder were unravelled. As time went on, the word "Telegraphy" was dropped from the name and it became "The Wireless Institute of Australia". Operation was continued after World War I and until 1932, when it re-formed itself as the Institution of Radio Engineers, Australia and the Wireless Institute of Australia ceased to operate.

We must be careful to avoid confusion with that fine amateur body, the present Wireless Institute of Australia which, in NSW, commenced operations as such in 1937, and carries on the kind of activity which, in the early days, did so much to develop the commercial application of the science.

HOW WIA DEVELOPED

This is the story of how it all happened.

The 20s was a glamour decade for radio. The thermionic valve had made its presence felt — telephony was opening up a new field, with much more appeal to the man in the street than Morse code signals had — amateur experimenters were conducting music broadcasts — Charles Maclurcan's regular Sunday night concerts had become an item of conversation on Monday, so that by next Sunday many more were trying to listen, mostly on crystal sets with headphones. The more sophisticated had built for themselves "valve" sets, some even with horn type loud speakers, and some of the broadcasters of the day were names well-known to their many listeners. Such names as Otto Sandel, Basil Cooke, R C Marsden, Brooker, Charlie Slade, Stevenson and O F Mingay were becoming household words. Flo Wallace's shop, in the Royal Arcade, had become a "Mecca" for the wireless-minded lads of the day. Here they bought the components to build their receivers, and many of these lads built a lifetime career in the industry from such beginnings.

EARLY DISASTERS

The greatest disaster, in those days, was when the "A" battery ran flat during the concert. This was even worse than when

somebody nearby rustled a newspaper while you were concentrating on the headphones listening to a signal, or searching with the "cat's whisker" for a sensitive spot on the crystal.

World War I was over, and a great deal of radio development had resulted from it. Many experimenters had enlisted and, because expert knowledge was scarce, they had been eagerly seized by the Defence authorities for service in Communication Units — in fact, about 75% of the members of the Wireless Institute of Australia had served in the Armed Forces, as most were of the appropriate age.

Many of those returning from the war had their appetites whetted for further development of radio and, as they resumed civil life, formed themselves into Radio Clubs. These sprang up mainly on a district basis in and around Sydney, and in some country areas. Several of these clubs affiliated with WIA, and examples were district clubs from Concord, Croydon, Northbridge, Balmain, Leichhardt, Marrickville, Artarmon, Waverley, Strathfield, Illawarra, Wahroonga. Job related clubs also came into being, examples being the "Railway & Tramway" and "Postal Institute". Records reveal that, by 1922, these clubs were very active indeed under the aegis of WIA.

Old records of Institute meetings offer a fascinating area for exploration and reveal a surprising degree of investigation into many things which we, today, find an accepted part of everyday life, but were then visions of the future.

NO BATTERIES?

For instance when O F Mingay lectured on "The Application of Electric Power Supply to Radio Equipment", he let his audience into the surprising fact that radio receivers of the future could be worked from electric mains, and horrible messy batteries could be eliminated. Another member, Dr W G Woolnough, who was, as well as being a radio experimenter, an eminent geologist, told how he had made the first automobile journey to Central Australia, and used a wireless set to communicate with Adelaide. During his lecture to the Institute in 1924, he forecast how, someday, wireless would bring entertainment to the lonely outback and would provide a vital need both in the fields of medical assistance and in education.

Charles Maclurcan, the best known of the amateur transmitters and, at the time, the President of WIA, achieved fame by communicating with New Zealand on a power of only nine watts. This was the start of a wide quest, thereafter, to achieve efficiency on low power, and many were the theories expounded at WIA meetings.

When it became known that the Commonwealth Government had allocated the sum of £800,000 to radio communication, WIA, at the suggestion of Mingay, urged the Government to use this "substantially in the public interest and not to return it to consolidated revenue", as the latter was what seemed likely at the time.

Meetings of WIA had, for some years, been conducted in the Marconi Schoolroom controlled by AWA, but in April, 1922, it secured for itself a club room at Queen's Chambers, Dalley Street, at a rental of two pounds per week, and there it installed the transmitter for which it had received an experimental licence. In retrospect, it is interesting to note that a claim was made at a WIA meeting, in 1923, to the effect that the WIA Headquarters was the location of the "Nucleus of the one and only Wireless Lab in Australia" — it had just procured a wave meter, complete with a Bureau of Standards (USA) Calibration Certificate, a Thermo-coupled Microammeter complete with shunts, and a Complete Valve Tester. We may well smile at some of these things today, but nearly 60 years ago, members were proud, indeed, of such equipment.

WIA WENT NATIONAL

While these things were happening in NSW, similar interest in radio had, of course, developed in other States, and by 1924, it was decided, largely as a result of urging by Mingay, that the time for a nationwide organisation had arrived, and so, on May 16, the first Australian Wireless Convention was held at Melbourne Town Hall, with the result that WIA became Federal, and a further integration of Radio Clubs and similar societies occurred on an intrastate basis. Each State had sent representatives from its major radio organisations, and it is interesting to note that, from Queensland two organisations were represented, viz, the Radio Society of Queensland and the Queensland Institute of Radio Engineers.

When the Commonwealth Government sought to frame regulations regarding national commercial broadcasting, valuable co-operation was given by WIA. The Chief Radio Inspector was a member of the Institute, and as it was, at the time, the main channel for the concentration of technical knowledge, some sound guidelines resulted.

"FATHER" OF IREE JOINS WIA

A matter worthy of note, at this stage, is that on February 14, 1922, Oswald F Mingay (later fondly known as Ossie) became a member of WIA. He was a remarkable man — a human dynamo — and one who had a very obvious hand in most of the important things that happened to WIA from that time on. Many consider him as the "father" of what IREE is now celebrating, and the reasons for this will be apparent as the story unfolds. He was, at the time of joining WIA, already the Honorary Secretary of the Military Radio Association of Australia (formed during World War I) and held the rank of Lieutenant. By September 1922, WIA had appointed him as Treasurer, and by December, also as Publicity Officer.

Most of the original 1910 members were still active in the early '20s and the foundation chairman, George A Taylor, was still lecturing to members in 1923.

During 1922, the radio art was accelerating very rapidly. Interest in joining WIA had become widespread, and the Institute felt that the time had come when it should initiate steps to secure recognition as an Incorporated body under the Companies Act. Up till that time it had been an unofficial organisation although a very active one, and its application for registration was granted on May 26, 1922.

Articles of Association were formulated and grades of membership, "Full" and "Associate" were introduced. This resulted in the necessity for a Qualifications

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Committee, and the first such Committee consisted of Messrs Maclurcan, Cooke, and Stowe. This was well before the existence of recognised academic gradings in this new field, and led to the introduction later of the regular, annual examinations held by the Institute.

"KNOW-HOW" TEXT

Very few textbooks existed, and the Admiralty Handbook of Wireless Telegraphy 1925 later became the standard text and contained all the significant "know-how" of the time when it was published. It was used by the Institute as the basis for examinations. Not until 1933 did recognised professional radio engineering qualifications exist in NSW when the Sydney Technical College introduced their Associate Diploma in Radio Engineering, and it was a few years later before there were any who obtained the qualification. Electrical Engineering degrees at Sydney University included little specialised Radio content.

One of the highlights of the Radio Year in the '20s was the regular Annual Radio Exhibition at the Sydney Town Hall. These were subsequently organised by the Electrical and Radio Development Association (ERDA). However, the idea was the brainchild of WIA which pioneered and received an overwhelming response from the industry when, with O F Mingay as Director, they ran the first Exhibition from December 3-8, 1923. A profit of 750 pounds resulted, and over 12,000 visitors paid for admission. The success of the first Exhibition was such that, from then on, it had to become a matter for participation by the commercial houses.

A Papers & Publications Committee was formed in 1922, under the chairmanship of W H Newman and, although it was not until January 1924 that an official organ was announced, this committee earns recognition as the predecessor of today's IREE Publications Board. The first official organ was "Sea, Land & Air", and later, when the former ceased publication, the journal "Radio" was appointed. Both were privately published, at the time, and it was not until several years later that the body owned and controlled its own journal.

"IRE (AUST)" REGISTERED

The next event of interest happened on August 16, 1924 when Mr E T Fisk (later Sir Ernest), who was then a member of WIA, together with some of his colleagues from AWA Ltd., effected with the Registrar General of NSW registration of the name "Institution of Radio Engineers, (Australia)". No record of any activities of this group is extant, but the fact of the registration will become significant later in the story.

Each year, WIA became stronger as the industry exanded, and what had been an organisation of enthusiastic amateurs, had become, predominantly professional in a vocational sense. Radio receivers were no longer homemade, but had become the product of commercial manufacturers.

AMATEURS GO COMMERCIAL

The amateurs who had built up their technical competence, had been "bought" by the manufacturing companies, to head their laboratories and to supervise their manufacturing activities. Where else was the right kind of knowledge to be found?

Other experimenters had turned their hobby into profitable businesses in becoming sales agents and servicemen for manufacturers.

Except for use in remote country areas, receivers no longer operated from batteries, for the mains-operated receiver had been born, and everything in the radio garden was lovely — until the authorities "threw a spanner in the works" by decreeing that mains-operated radio receivers were classified as electrical appliances and, as such, could only be serviced or installed by persons licensed under the Electrical Contractors and Electricians Licensing Act.

A General Meeting was organised on November 23, 1931, by Mingay, who was then Secretary of WIA, to which were invited all interested persons, whether members of the Institute or not, for the purpose of alerting them to the danger to their jobs, of the new ruling, as very few of them possessed an appropriate licence. The industry had just expanded into what it was, and radio had unobtrusively moved from the realm of the enthusiastic amateur to that of the businessman. What was to happen to WIA, which had been in the forefront of all this growth, and was the body which included the technical experts of the day?

A TIME FOR CHANGE

The answer seemed obvious. WIA had to change also. Very few of the existing members were still purely amateurs. The commercialisation of the art had been so rapid that its tide had swept up almost all the experts and, as the depression at the time was squeezing most other callings, the prospects for this new thing were too good not to be in it commercially.

The name WIA had been associated with amateur activities for over twenty years — it was the epitome of amateurism — and so it had to go too.

To what could it be changed?

There were various suggestions, but one seemed obviously right. The Institution of Radio Engineers was the name of the professional body in USA with broadly similar aims, and one of WIA's own members, Mr E T Fisk, had wisely reserved the name, in Australia, seven years earlier. It has always been the writer's belief that Mr Fisk (later Sir Ernest) was a person of considerable foresight, who had unbounded faith in the inevitable bright future of radio, and who envisaged a fully professional institution becoming a reality in Australia at some future date, and it is perhaps interesting to contemplate whether his action might have been influenced in any way when the news of the apparently unregistered Queensland Institute of Radio Engineers surfaced at the National Convention in 1924, because within three months of that date, he had effected the registration of IRE Australia.

Be that as it may, "Ossie" Mingay, as Secretary of WIA, explored the possibility of this name with Mr Fisk, who was enthusiastic about the idea. When the mechanics of the change were investigated, it was found that there were no financial members of IRE, and the Registrar-General could only recognise Mr Fisk (President) and Captain Toombs (Secretary), who had been named as officers in the application, and so, a method had to be found — but that was not beyond the genius of Ossie Mingay, as will be seen.

All these matters had been the subject of a discussion, at Federal level, and a policy determined, at a Convention, which was in accord with the recommendations made by WIA (NSW Div). However, when it came to the moment of action, the other States were hesitant, and it became clear that if the NSW Council had the courage of their convictions and the support of their members, they must go it alone.

Consequently, on February 14, 1932, a notice was sent to all members in NSW calling for a Special Meeting on February 29 to vote on the recommendation of the Council. The meeting was attended by 64 members and 21 proxies were held, and the result was that the recommendation of the Council to form the WIA into the IRE was adopted by 79 votes to 6.

The nature of this decision required, of course, a Confirmatory Meeting and this was held on Tuesday, March 15, 1932 when a motion by Messrs Norville and Mingay was carried unanimously.

"That this meeting confirms the Special Resolution of February 29, 1932 authorising the Council to take all the necessary steps to form an Institute of Radio Engineers, Australia."

LAUNCH DATE

It now seems logical to pinpoint this meeting as the moment in time which represents the launching of what is now the IREE, and makes a good target date for treating March 15, 1982 as the 50th Anniversary, although, if one considers its worthy predecessor, a venerable 72 years can now be totalled up.

It might be an interesting exercise to contemplate the 21st century. Will IREE treat March 2010 as its centenary, or wait until March 2032? The writer pleads Leave of Absence from the ceremony.

Now came the task of implementing the decision, formulating a new policy and closing down WIA (NSW Div).

As explained above, there was some difficulty, as only the President and Secretary of IRE were officially recognised as existing, but Ossie Mingay, the WIA Secretary, had an idea. There were four other WIA members who had also been IRE members and, with this in mind, a meeting was called on April 26, 1932 as a meeting of IRE, which in addition to the two officials, included Messrs Hooke, McDonald, Reed and Crawford (the four IRE members referred to above) who together with the President and Secretary, constituted an IRE quorum, and as invitees to the meeting, were three other WIA members, Messrs Renshaw (President), Mingay (Secretary) and Norville (Treasurer).

This meeting passed two resolutions — the first, admitting as members the entire list of WIA (NSW Div) members who had en masse, applied for membership of IRE, and the second, appointing a provisional Council to manage the affairs of the Institute until a General Meeting could be held. The following Councillors were appointed: Messrs Fisk (President), Hooke, McDonald, Crawford, Renshaw, Gilmour, Norville, Mingay, Hill, Bean, Emmelhainz, Tyler, Thom, Kennell and Turner. Toombs

resigned as Secretary of IRE and Mingay, Secretary of WIA, became also Secretary of IRE.

INAUGURAL DINNER

The first activity arranged by the new Council was an Inaugural Dinner (many felt it was a coming-of-age party). This was held on May 30, 1932 and was attended by 123 members.

Then followed a well advertised Public Lecture in the State Theatre Conference Hall, at which the speaker was Major C W C Marr, Federal Minister for Health, who had been Commanding Officer for the Anzac Wireless Squadron during World War I. An honoured guest at this meeting was the Chief Engineer of the BBC, Captain Eccesley.

On June 11, 1932, a Final Meeting of WIA (NSW Div) Council was held for the purpose of officially closing it down. It was reported by Phil Renshaw, President, that all WIA members had formed the IRE. A motion was passed that it, WIA (NSW Div), be wound up forthwith, and the Institute's solicitor was named as Liquidator.

This became a story in itself, because when the liquidator came to the stage of seeking the registration certificate in order to return it to the Registrar-General, he seemed to meet with a series of delaying tactics because there was a growing feeling of goodwill toward a small amateur body called the "Association of Radio Amateurs" which had developed after the closure of WIA. This feeling was behind the Resolution of the IRE Council, on December 6, 1932, to place in the hands of the Trustees (Hooke and Norville) for use by ARA, its own Radio Transmitter and the Maclurcan Cup. This cup had, until recently, been eagerly competed for, on a regular basis by NSW amateur transmitters, and the condition of its transfer was that these competitions should be revived and continued. A "wait and see" attitude had developed about returning the WIA registration certificate, and hope was emerging that, some time in the future, amateur radio would again become significant in the State.

By 1934, the interest in electronic communication had become quite wide, and this year saw another technical professional body come into being with the inaugural meeting of the Institution of Engineers Australia, Communications Section, which was held on September 26, and still continues alongside IREE as a leading professional organisation.

It was reported at the Council Metting of April 3, 1935, that the Registrar General required the final liquidation of WIA to be completed, and the liquidator to consent to a new Company. O F Mingay, Secretary of IRE and also nominally Secretary of the defunct WIA (NSW Div) reported difficulty in holding the necessary meeting because there were no WIA financial members. On June 4, 1935, following another letter from the solicitors, the Secretary was empowered to call together sufficient members of the Council to re-form WIA with a temporary fee of one shilling per head to pass the necessary resolution required to carry into effect the legal requirements for winding up.

WIA REBUILT

Somehow, (and many would say, fortunately) this became a long-drawn-out process and never actually took place in its originally intended form, because by April 14, 1937, it was resolved by Council not to cancel, but to hand the original certificate of registration to IRE's good friends, a group of amateurs who had, by now, rebuilt themselves into a sound organisation. The plan originally adopted in 1935 was implemented and a meeting organised by O F Mingay, was held on June 2, 1937, in accordance with the solicitor's advice, and four resolutions were passed as follows:

1. "The Institute accepts from IRE Certificate of Registration 86355 issued on 26/5/22.
2. The Institute indemnifies IRE against any possible liabilities.
3. It undertakes to function solely as an amateur body.
4. It accepts the resignation of O F Mingay as Secretary in favour of W G Ryan."

The Wireless Institute of Australia (NSW Division) has continued to develop, and today, ably represents the amateur radio enthusiasts (Hams) of the State as their official authorised body.

IREE AND ROYAL CHARTER

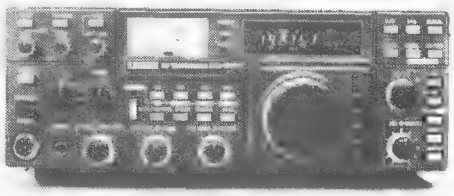
Reverting back to the continued development of IRE, the Articles of Association were amended and new Articles adopted on February 20, 1933. It has grown and expanded as the science has developed. There have been name changes. Firstly, the original discussion had used the word "Institute" and the "birth" resolution used this term, but after the first meeting of the re-formed body, the word "Institute" was replaced by "Institution". Then, as the science expanded, the name was obviously too restricted adequately to describe the Institution, and it was changed to The Institution of Radio and Electronics Engineers Australia in January 1965. It continued as a Public Company, registered in NSW, until 1967, when it was honored to receive a Royal Charter.

If George A Taylor, who died in 1928, at the early age of 56, could see IREE today, or even to be a "ghostly visitor" at an IREECON Convention, do doubt he would be proud at what had grown from the seed he planted in 1910, and how true, still, is his call for mutual co-operation between those who professionally lead the world of electronics.

Name changes by this body have reflected the history of the science, which was originally introduced as "wireless telegraphy" — but then, telephony evolved, making the original title too restrictive, and so it became just "wireless" without any addendum. There were, originally, no specialist wireless engineers — they grew out of the science itself, and the professional man appeared as the necessity for him arose. Wireless and radio are synonymous terms and the latter became the preferred word for modern usage but then, as the science spread and produced specialists so widely outside the restricted field of radio, the word "Electronics" had to be added to the name.

Reprinted from "Monitor" Dec '82

THE NEW WORLD CLASS OF HF



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FOLDED-ELEMENT COLLINEAR ANTENNA FOR 2 METRES

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The "Slim Jim" is a most popular 2 metre antenna for stations within reasonable distance from a repeater and where omni-directional characteristics are required. This was featured in a previous article by the author on the construction and operation of an updated "Slim Jim".

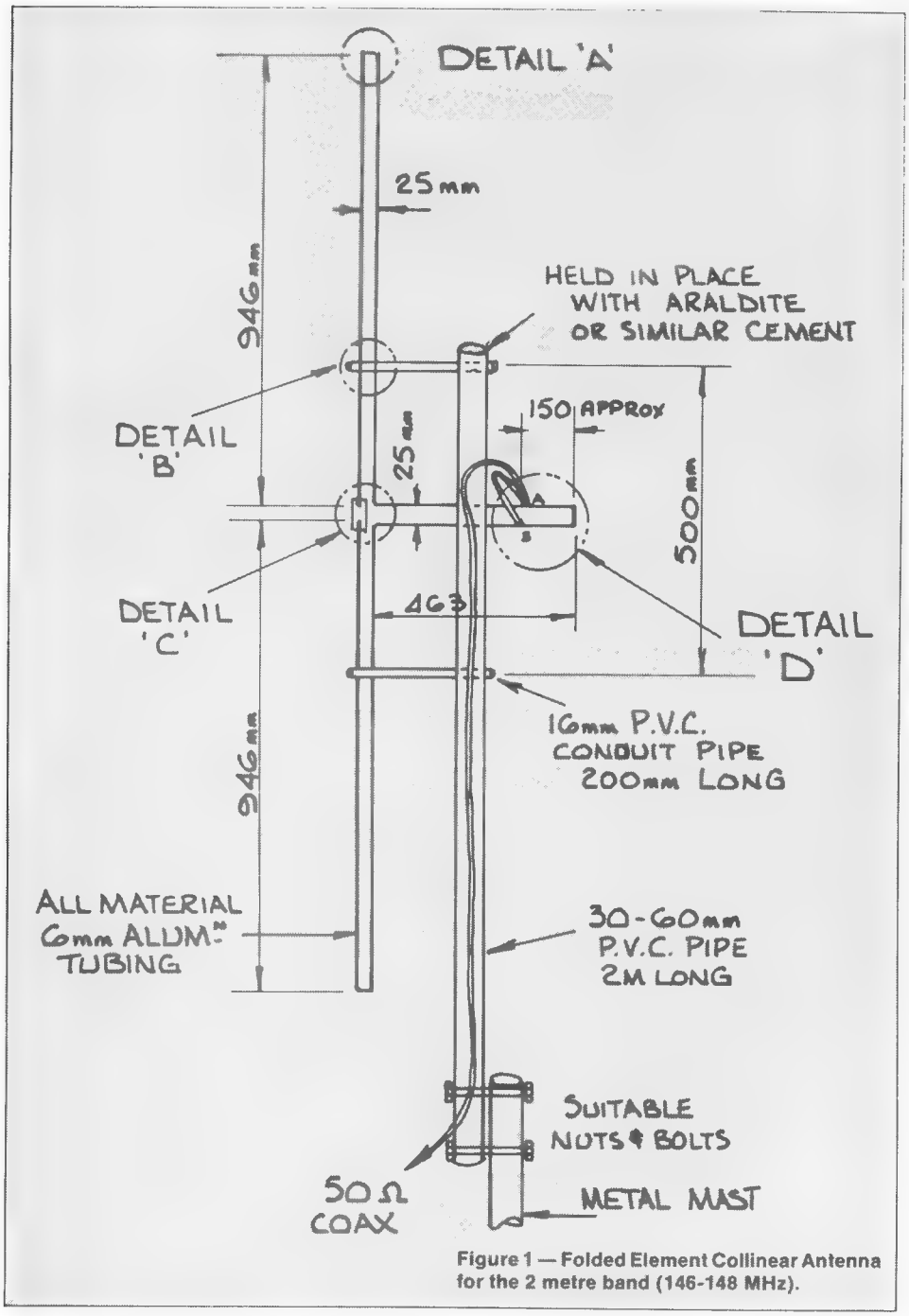
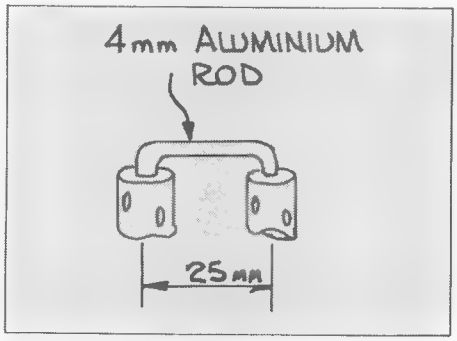


Figure 1 — Folded Element Collinear Antenna for the 2 metre band (146-148 MHz).

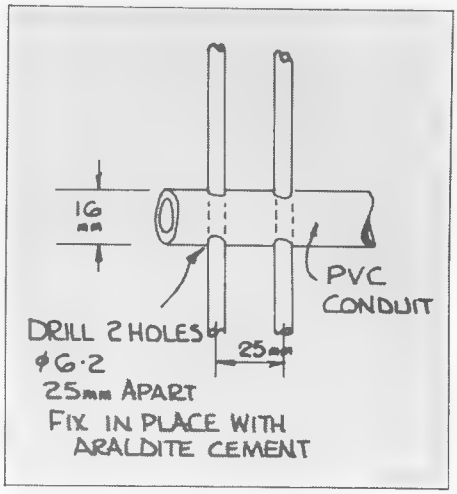
In an attempt to derive more antenna gain and still retain omni-directional properties, the old, still popular "two half waves in phase" antenna was revalued. This type of antenna is featured in many text books as the "Plumbers Delight" because it can be constructed with copper pipe using plumbing elbows etc. The antenna is claimed to have a slight gain over a "J Pole" or "Slim Jim", however, on test it has been found that whilst there is a "gain" there is also a problem in achieving a satisfactory impedence match resulting in a higher than desirable SWR.

DESIGN

The antenna to be described, was originally developed by F C Judd G2BCX for using a repeater in UK and is a variation of the original "two half waves in phase". This antenna uses two folded dipole elements fed in phase through a quarter wave stub and a co-axial cable "balun" matching system. The result is an antenna that is balanced and symmetrical, and exhibiting a very good impedence match resulting in a low SWR over the 2 m band and providing worthwhile gain.



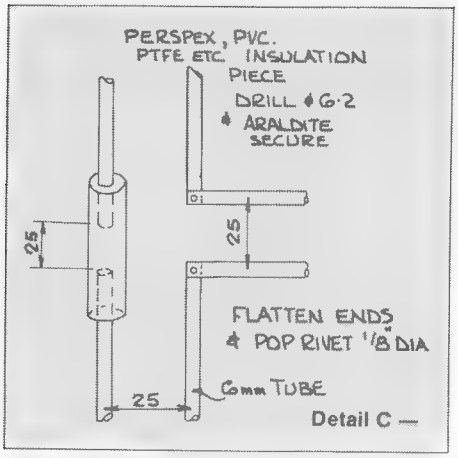
Detail A — Drill out tubes and press in end piece. Centre punch to locate and hold.

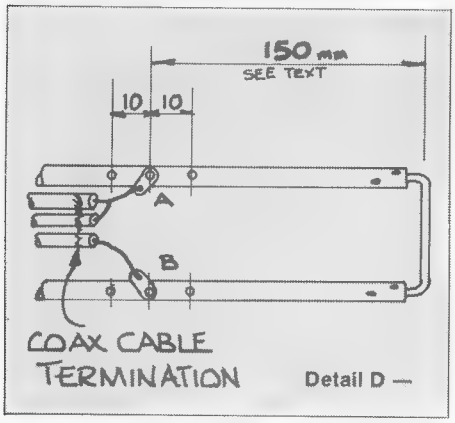


Detail B — Fix in place with Araldite.

CONSTRUCTION

The supporting frame for the antenna is made from electricians PVC conduit, a most suitable material for antenna construction and preferable to wood. The elements are made from (¼") 6 mm aluminium tubing. This is readily available and reasonably cheap to purchase.





The general construction is reasonably straight forward and details are shown in the sketches. The end sections of the dipoles and the matching stub are made from 4 mm aluminium rod.

Other metals, brass etc could be used, however, there is an electrolysis problem with dissimilar metals resulting in corrosion and consequent high resistance connection. All mounting of elements is achieved by drilling a neat clearance hole and securing with "Araldite" or other epoxy type cement.

Care must be taken when drilling 16 mm holes through the PVC support mast. A smaller hole can be drilled first and then enlarged with a round file or reamer.

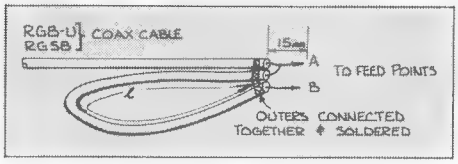
COAXIAL CABLE "BALUN"

The balun should be made from a section of the same cable that is used to feed the antenna. A cable with low loss is preferable and RG8 or equivalent is suitable. If the overall length of cable is not excessive, say, less than fifteen metres, then RG-58-AU "foam" dielectric is quite suitable. This cable combines low loss, thin diameter, and easy handling. The ½ wave section must be carefully cut to the correct length depending on the cable dielectric. If standard solid dielectric cable is used, the velocity factor is 0.66 resulting in a length of 673 mm measured from outer covering ends. (see sketch). If "foam" cable is used the velocity factor is 0.75 giving an overall length of 765 mm.

The section should be looped and taped as shown and carefully terminated. The termination can be water proofed by PVC tape or some sealing compound. If water enters the cable it will be damaged and characteristics altered considerably. The "balun" and cable ends are soldered to lugs and screwed with self tapping screws to the matching section.

TESTING AND ADJUSTMENT

After deciding on the final location of the antenna and the length of the feed cable, final connection should be made as shown in Detail D. The antenna with full length cable connected should be lifted as



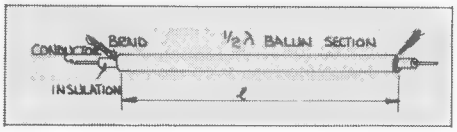
4:1 Balun ½ wave matching (see text)

l = ½ wave. If RG8 or RG58 standard polythene co-axial cable is used, velocity factor = 0.66.

l = 673 mm

If RG8-AU or RG58-AU foam insulated cable is used, the velocity factor = 0.75. l = 765 mm.

½ λ = 150 x .75
147 MHz = 765 mm
= 150 x 0.66
147 MHz = 673 mm



high as possible in the clear and the SWR checked. If all dimensions are correct, and construction details followed, an SWR figure less than 1.5 will result. An improvement can be made by moving the tapping point ± 10 mm from the point shown.

The author has obtained SWR results better than 1.2 over the band with the dimensions shown.

When testing is completed, the cable can be taped or clipped to the support mast and the antenna placed in its final position.

The SWR figure will not change significantly and the antenna will give good results over the entire 2 m band.

AR

TV LINE OSCILLATOR INTERFERENCE

The problem of TV receiver line oscillator interference on amateur bands is being examined in the WIA EMC and Standards areas.

Federal Executive is seeking information from Divisions which may assist in the preparation of a submission to the Standards Association of Australia proposing improvement in the relevant performance specifications for television receivers. A similar but more general request for information on the problem appeared in the National EMC Advisory Service feature in last month's AR (Page 66).

Duplication of information submitted in response to these requests is unnecessary, since the EMC Service and FE will collate all reports received from both sources.

AR

RSGB HF CONTESTS

The custom whereby each HF Contest organised by the RSGB has had a different adjudicator each year and therefore a different address for logs to be sent to has caused many problems for entrants from outside the UK who do not necessarily have the information needed. In future the procedure will be much simpler as entries for ALL RSGB HF CONTESTS from outside the United Kingdom may be sent to:—

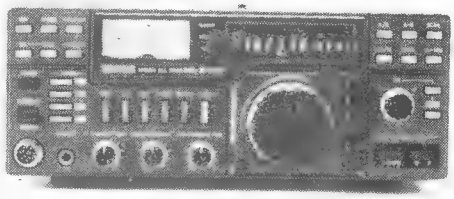
PO Box 73,
Lichfield,
Staffs, WS13 6UJ,
England.

Please write the name of the contest being entered on the top left-corner of the envelope.

from Region 1 News — Oct '84

AR

THE WORLD CLASS 2 METRE BASE



Do you remember the IC-211? The boys at ICOM do. You see, it set the pace for 2 metre base station performance many years ago. Optically chopped tuning, processor control, digital PLL, and many features at that time unheard of. In 1984 ICOM are still setting the same high standards for 2 metre base station performance. Dual VFO's, multi mode, 10 Hz PLL tuning are a few of the basic features. This world class radio is supported by a large range of options, many can be seen at your local ICOM dealer.

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TECHNICAL CORRESPONDENCE

CURTAINS FOR WA AURORAL COMMUNICATION?

John Hawkins, VK6HQ
39 Glyde Road, Lesmurdie, WA 6076

Intrigued by something experienced by Bert VK6ZY during an aurora in Western Australia sometime previously, a study was commenced in January 1981 by John VK6HQ under the auspices of the WA VHF Group.

The objective of the study was to gauge the possibility of communication from WA at VHF and UHF via the aurora.

Apart from an awareness that this form of communication had long been the norm in the northern hemisphere and that some observations may have been done in the south of the State during the International Geophysical Year (IGY) of 1957, the subject had to be tackled literally from the ground up. Some information was found in a report from New Zealand.' (All reports and papers that were drawn upon appear in the bibliography.)

What was the aurora really like and from where in the southern hemisphere might it simultaneously be seen? Few I asked had seen it. Even ZS stations in Capetown, lower in latitude than Perth, could not recall mention, let alone the sighting, of one, which immediately rules out big DX!

At this juncture I approached Perth Observatory who responded by loaning three books[2,3,4] and at the same time providing a list of auroral sightings. They emphasised that such occurrences were logged only if they coincided with their main observing operations and consequently the list was by no means complete.

While I pondered how to begin to predict the onset of an aurora, I read. As I read I concluded that auroral theory was still being written.

Certainly, when the auroral effect reaches the E-region in the atmosphere signals begin to bounce back, but *why do the magnetic fields at the poles "light-up" progressively outward, following a disturbance at the Sun?*

Akasofu, writing on the subject as far back as I could trace in 1960[5], describes in December 1982[6] the visual (northern) aurora thus:

"An astronaut looking down on Earth from high above the north pole in winter would see a huge glowing ring. This oval, about 4500 km across, is approximately centred on the geometric pole and passes across Alaska, northern Canada, Greenland, Scandinavia and Sibera.

"From ground level, one sees a gigantic curtain of light, intermittently curling up like a whirlpool of flame over the frozen Arctic Ocean and endless forest and tundra.

"This spectacle is the Aurora Borealis (Aurora Australis in the southern hemisphere) one of the magnificent natural occurrences on Earth."

Whilst taken perhaps out of context the "exploded view" of the aurora, Fig 1, as described by Gerhard Haerendal[7] shows the almost "frictional" effects resulting in the auroral generator.

Through an auroral "atlas"[8] I learned that the aurora can be classified visually under:

Condition — quiet, pulsing, etc
Structure — homogenous, rayed, etc
Form — arc, veil, etc
Brightness — indexed 0-4
Colour — classed a-f.

Earlier accounts suggested that the Sun flared throwing particles Earthwards, where they in turn "jiggled" the magnetic fields around the poles like gas in a flourescent tube. Akasofu, however, goes on to say[6] *"there is little doubt that the aurora is produced by a very high powered electrical discharge (as much as a million megawatts) in the polar atmosphere".* This makes sci-fi like "Siva!" almost credible!

Reports on the invisible aurora and its effect upon VHF communication were still, even in 1951, news, but the first reference appears to have been in QST, May 1939. After that, 56 MHz "aurora effects" reports

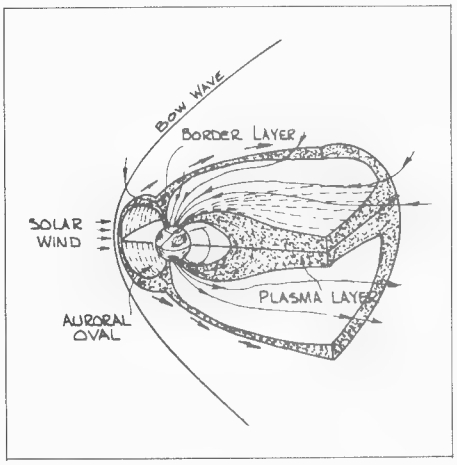

Figure 1 — Three dimensional section through the magnetosphere with the source area of the Aurora. The border layer at the magnetopause and the plasma layer in the tail. Acknowledgement to Sterne and Weltraum.

became commonplace. It was not until QST for March 1949 that two-way communication "via the aurora" on 144 MHz was reported.

R K Moore cites[9] the now famous QST report[10]:

"W2AMJ makes some interesting observations regarding conditions noted on 56 MHz: the Northern Lights were going to town on the night of 24th February. I got on 56 MHz at about 8.20 PM. I sent a CQ in ICW and was rewarded with a call from W8VO in Akron, Ohio, also on ICW. His carrier was S9 but had the most peculiar sound to it, with or without modulation . . . I swung over to phone and he advised me that the phone was unintelligible. Then he shifted to phone, and boy, if you ever heard inverted speech you should have heard this. It sounded nothing like voice modulation. We continued the contact on ICW-S9 both ways. At no time was there any appreciable fading. The signal was just like it was around the corner, except for the peculiar combinations of howl and roar that accompanied his carrier . . ."

Auroral disturbances can extend out from 80 km to 1000 km and influence radio signals in the HF, VHF and UHF range in several ways. Not only this but radio noise emissions in the VLF range and known as the "dawn chorus" occur with the onset of an aurora.

Both the Carmel and Mundaring observatories continued to be very helpful for subject documents. In addition, I arranged for the WA VHF Group to be added to the circulation of the weekly "Preliminary Report and Forecast of Solar Geophysical Activity" (PRF) originating from the US authorities in Boulder, Colorado. The PRF, amongst many other things, diarises Alerts in the past period, Soflares, 245 MHz Radio Bursts in flux units, and so on. It also makes predictions as to the effect of reappearing coronal holes.

It was hoped to correlate WA sightings with these reports and build up a pattern for predictions. Regrettably, there was insufficient auroral activity in WA to use this approach.

I then stumbled on an article in *Radio Communication*[11] mentioning twenty seven day auroral charts maintained at G8VR and reporting a discussion with Charlie G2FKZ, the IARU aurora co-ordinator. As I knew G2FKZ personally from IGY days I wrote to him and received charts, diagrams and a cassette tape in return.

G2FKZ has been associated with auroral communication and prediction for twenty five years or more. What follows is a resumé of his notes to me

On either side of an eleven year solar cycle there are peak periods for the aurora. The peak on the upward side occurred in 1978/79 and we were, as at August 1982, at the peak on the downward slope

There are about five causes of auroras. Auroras are indexed on an "A" scale. The big ones, A-100 plus, are nearly always caused by disintegrating filaments, virtually impossible to predict and of short duration. The other major cause resulting in about eighty per cent of auroras is the coronal hole. These auroras are usually in the A-10 to A-50 sort of order and provide the "bread and butter" auroras.

It would appear Perth needs an index of at least A-100 to get in the auroral communication ball park. G2FKZ was not surprised that the aurora of 6th September 1982 had made itself known in WA; it was the biggest of Cycle 21 and reached A-162. Ironically, I missed it and only deduced that an aurora had occurred through talking to some rather baffled Perth HF operators later on.

Because coronal holes grow, spawn auroras, and then decay, sometimes over three or four rotations of the Sun, the twenty seven day cycle is a useful guide. However, with relatively low indices on average the chances of working auroral QSOs from Perth, according to G2FKZ, are slim.

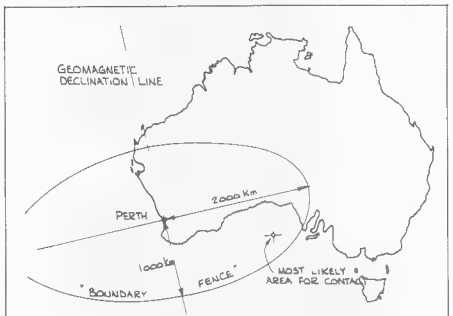

Figure 2 — G2FKZ's "Boundary Fence" conception. For all practical purposes communication outside area a physical impossibility.

G2FKZ considers that a "boundary fence" exists with regard to auroral communication generally. It will be seen from Fig 2 that an ovaloid area aligned with the station's longitude and approximately 2000 km deep by 4000 km wide surrounds any given station outside of which he cannot hope to contact a second station. Exceptions are few in practice. Distance/bearing graphs appear at Fig 3.

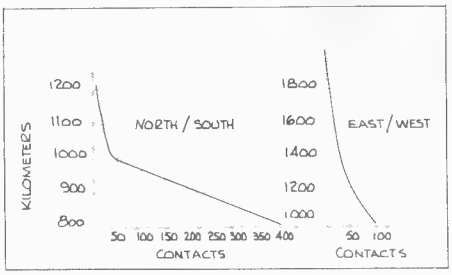

Figure 3 — Guide to QSO direction in the Northern Hemisphere.

Beam headings, see Fig 4, are aligned for minimum attenuation of the signal with one station or the other making the "long run" to cut down square law losses. The reflection point needs to be close to one station.

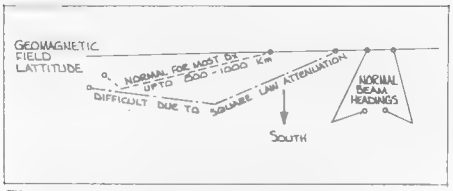

Figure 4 — Beam heading considerations — Northern Hemisphere. It does not matter which station is more south.

One antenna only need be elevated up to the E-layer height (about 300 or 400 kms minimum). The other operator then fires low and hits the same piece of sky 200 or 300 kms south of him. If both were to fire southwards they would hear much noise but not make contact.

If the "boundary fence" is the good news the bad news is that three quarters of the accessible area from Perth is out at sea. If Perth were "transplanted" no one in the northern hemisphere has put an auroral signal into the equivalent area. Two places were mentioned by G2FKZ as having supported research on the aurora by way of radar, MacQuarie Island and Heard Island.

Visual observations of auroras do not always mean that communication will be possible. Sometimes there might be good communication and no visible spectacle, sometimes the reverse and sometimes both.

From what G2FKZ relates, his rebroadcasted predictions coupled with other rapid alert systems keep interest in auroral propagation at a high level in the Northern Hemisphere: he has amassed something like 20 000 individual contact reports through which to sift and draw further conclusions. Clearly, however, our northern relations have a lot going for them with Northern Ireland singularly blessed with auroral sightings.

Going back to the occasion of 6th September 1982, 10 metres showed entranced propagation but shifted its skip rapidly from one DX region to another. On 80 metres several operators thought AC had got into their RX local oscillators such was the burbling effect of received signals. Perth Observatory, meanwhile, received several calls from commercial concerns in the country asking why they suddenly couldn't talk to one another by radio.

Perhaps these might all be pointers to the onset or existence of an aurora. I once asked a Norwegian station on 20 metres if he saw many auroras. He paused, looked from his window and reported, *"there's one there now! We usually know when they're about — we hear our repeater being triggered from Sweden!"*

So, with Cycle 21 ebbing slowly away, one last concerted effort was made from WA to "hear something on aurora". Perth Observatory agreed to call VK6HQ at any time during the period 1st to 31st March 1983 if an aurora were spotted.

That magic telephone call never came. Presumably if auroras had occurred the A-index failed to approach A-100

Boulder were asked to send us further PRFs and with particular thanks to them and to Dr Nikoloff, Dennis Harwood and librarian Carmell of Perth Observatory and Peter Gregson of Mundaring Geophysical Observatory, the project was put into suspended animation.

Since then I note with great delight the reappearance of the publication *6UP* and in it a fine article on the aurora by Roger VK2ZTB[12]. Roger mentions that in August 1978 a dozen stations in VK3, VK5 and VK7 broke the auroral scatter propagation "drought" of some twenty years with a vengeance.

With this in mind, perhaps all is not lost. Roll on, Cycle 22 . . .

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AR

THE ORIGIN OF 73

G Maxwell Hull, VK3ZS
Federal Historian

Amateurs have used the term "73" to express — 'Best Wishes' — since as far back as can be remembered. Of more recent times the term "73's" has crept into amateur jargon, both on the air and in amateur literature. Although to a great extent this has been accepted by common usage, it is in fact quite incorrect. As recently as a couple of months ago, following a Divisional Broadcast, an amateur was heard to 'call in' and correct the announcer on the use of "73's" instead of "73". The announcer's comment (and also that of a 'breaker') left no doubt in the writer's mind that the amateur attempting to correct the situation was considered "old hat" or to be "flogging an unwilling horse" so to speak. And so for the record, here is some information on the origin of '73"

The origin of "73" as the telegrapher's conventional signal of greeting has been ascribed to a dinner given to Andrew Carnegie on his 73rd birthday by the Order of Military Telegraphers. The dinner referred to was given on 27th November 1908, and the signal "73" was played upon in connection with his 73rd birthday. However, investigation indicates that the term "73" was used for many years prior to that time. This information came from the December Bulletin from the Navy Department Office of the Chief of Naval Operations, USA

The following material, believed to be authentic, is quoted from the "Telegraph and Telephone Age," dated 1st June 1934:

"It appears from a research of telegraph histories that in 1859 the telegraph people held a convention, and one of its features was a discussion as to the saving of 'line time'. A committee was appointed to devise a code to reduce standard expressions to symbols or figures. This committee worked out a figure code, from figure 1 to 92. Most of these figure symbols became obsolescent, but a few remain to this day, (well, in 1935 anyhow!), such as 4, which means 'Where shall I go ahead? Figure 9 means 'wire', the wire chief being on the wire and that everyone should close their keys. Symbol 13 means 'don't understand'; 22 is 'love and a kiss'; 30 means 'good night' or 'the end.' The symbol most often used now is 73, which means, 'my compliments', and 92 is for the word 'deliver.' The other figures in between the foregoing have fallen into almost complete disuse."

The following were still in effect in 1905 —

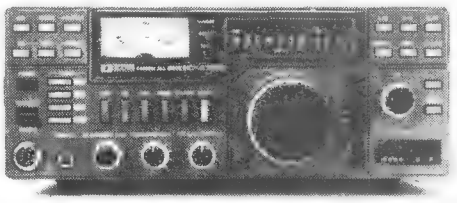
1 Wait a minute
4 Where shall I start in message?
5 Have you anything for me?
9 Attention, or clear the wire.
13 I do not understand.
22 Love and kisses.
25 Busy on another circuit.
30 Finished, the end (VA)
73 My compliments, or Best regards.
92 Deliver.

So there you are! This bit of history leaves no doubt that "73" is quite correct and even that has been changed to mean 'Best wishes'. So does "73's" mean Best-best wishes or 'Best wisheses' or what? And then "88" crept in somewhere too!

We'll leave the reader to think about it. 'Common Usage' of words and expressions has been the cause of some funny changes. 73.

AR

THE WORLD CLASS UHF BASE STATION



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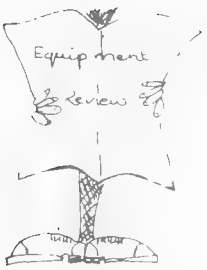


EQUIPMENT REVIEW

Kevin Phillips VK3AUQ
Hereford Road, Mount Evelyn, Vic 3796

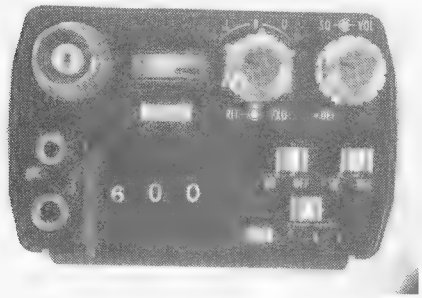
BELCOM LS-202E

The Belcom LS-202E is a compact, synthesised, two metre handheld transceiver featuring both FM and SSB modes of operation. The unit supplied for review was fitted with the optional NP-9 nicad battery pack (10.8 volt), CA-110E AC charger and SH-1 speaker microphone. It also comes as standard with a belt clip, carrying strap and a rubber flex antenna.

There are other multi mode rigs about, but not as a handheld unit, so it should have some appeal to those who do a bit of travelling and have no room for excess luggage. It is fairly small at 179 x 64 x 44 mm including all projections, and weighs about 500 g. Many FM only alternatives are no smaller or lighter.

APPEARANCE

Overall appearance is compact and fairly neat, until you try to use some of the controls. On the front, is a speaker and microphone, all else is blank apart from a label. Left side panel has a PTT lever, high/low power switch, repeater offset switch which can be either 600 kHz up or down, a tone switch which serves no useful purpose in Australia, and a button for lighting up the S meter. This side also contains the charging socket. Moving up to the top panel, there are two pairs of concentric knobs. One pair are the VXO and RIT controls which are only functional on SSB, and the other pair are volume/on off and squelch controls. VXO range is ±5 kHz, and RIT is ± 1 kHz. There are three slide switches for noise blanker, +5 kHz offset and mode selection. Modes are FM, USB and LSB. Next are the thumbwheel switches for selecting operating frequency in 10 kHz increments. These switches are small and fiddly to use, and would be difficult for anyone with big fingers to select a frequency with any speed. Next are two sockets for remote speaker and microphone. Each socket is a different size, so the two functions cannot be mixed up. A rubber bung fits into these sockets when not in use to keep out dirt and other nasties. Antenna connector is a BNC type. Last item on top is an "S" meter/battery condition meter.



Top view: From left — clockwise. BNC antenna socket, S meter/battery condition meter, RIT/VOX control, volume/on/off and squelch control, three slide switches, frequency selection thumbwheel and remote speaker and microphone sockets.

FREQUENCY RANGE

Frequency coverage is from 144.000 to 147.995 MHz on transmit, but I found that on receive it covered 144.000 to 153.995 MHz, not 140 to 149.995 MHz as I expected. It has an interlock to prevent transmission if MHz is 148 or above. The only exception is if the repeater offset is on, and a frequency less than 600 kHz from a band edge is selected. An example is

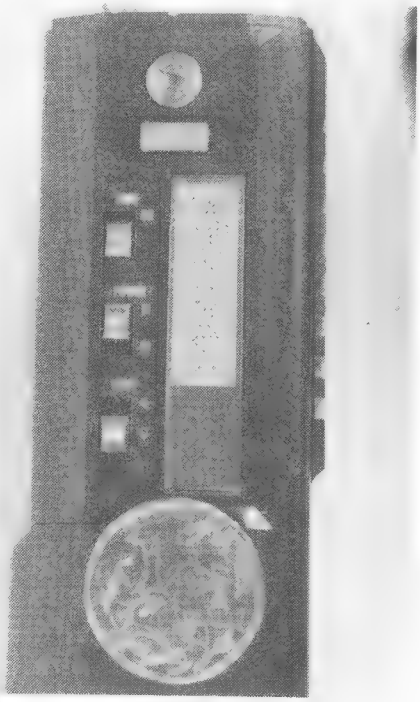
say 144.1 MHz selected, but you had last used the rig on the 146.7 MHz repeater. You had turned on the offset to 600 kHz low, so your new frequency is 143.5 MHz (out of band and very naughty). The same can happen at the other end of the band with offset high. The offset doesn't care what mode you selected.

Power output is claimed to be 3.5 watts when run on 10.8 volts, and the test rig ran at 3.8, and drew slightly less current than specified. On low power, it was still 1.7 watts, which is a bit excessive, but drops to a more reasonable 0.7 W when on 9 volts, or 2.7 W on high power. These figures are for the FM mode, and similar results occurred on SSB. It is very easy to drive it to full output on SSB, as mike sensitivity is reasonably high. FM deviation was measured at 5 kHz. I was a little disappointed in spurious response, as a number were just out of specifications. There were a couple either side of the carrier, at 10.695 MHz removed, and they varied in level depending on mode, power and frequency selected. Second and fourth harmonics were a bit high also, but third harmonic was very low. Most transmitters radiate broadband noise in the form of a noise plateau. This rig has a noise plateau of —80 dBr on SSB, and — 86 dBr on FM. All spurious should be able to be improved, and other units may be much lower.

RECEIVER

Receiver performance was better than specifications on most counts. Belcom claim better than .25 microvolt for 10 dB S/N, and test result showed 17 dB S/N for FM, and 17 dB SINAD on SSB, where specification is better than 12 dB. At low level signal input, audio output is not very high, but I found it adequate for my needs. The squelch control works on both FM and SSB, and worked fine. Like most receivers, this one has a few spurious responses, and they tuned at a different rate to the main signal except for image responses that tune normally.

The receiver is a conventional superheterodyne type with single conversion for SSB and double conversion for FM. First IF frequency is 10.695 MHz for both modes, and 455 kHz for FM. The RF amp is a 3SK114 dual gate FET, followed by a bipolar transistor mixer. After the mixer, the signal splits up and goes through a three stage amp for SSB, and then to a balanced demodulator. On FM the signal is mixed with a second local oscillator in an IC, and passes through two filters at 455 kHz, limited and then quadrature detected. A single IC is used for audio amplification.



Left side panel compared to a dollar coin.

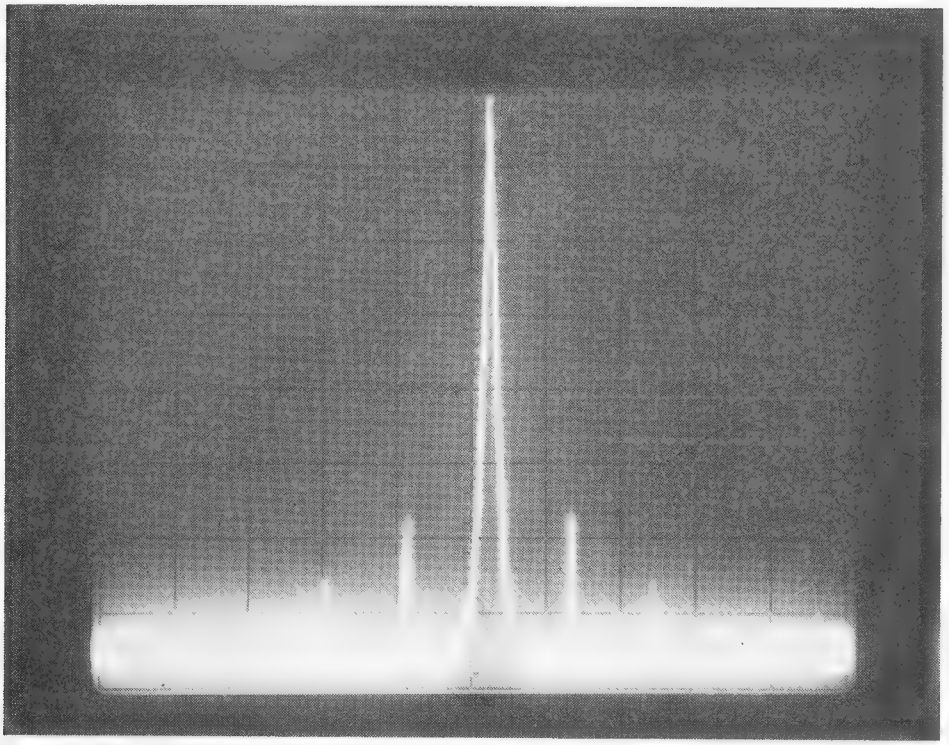
TRANSMITTER

On transmit, the SSB audio and 10.695 MHz carrier signals are fed to an IC balanced modulator, then to a crystal filter (same one as on receive), to eliminate the other sideband. From there it is heterodyned to the final frequency and amplified in several stages. For FM operation, the VCO is modulated, then mixed to final frequency and amplified as before.

This rig doesn't offer any frills such as scanning or memory facilities. If you want to tune around the band it must be done with the thumbwheel switches. On SSB that can be fairly hard, as to tune a segment of the band, you have to use a combination of thumbwheel switches, 5 kHz offset slide switch and VXO control. That can be somewhat frustrating, so I would suggest you tried leaving it on 144.1 MHz most of the time if you want to use SSB. That way you can establish a QSO on the calling frequency and then shift to another mutually agreeable frequency. On FM it is easier to tune around as most frequencies in use are about 50 kHz apart, but it is still easier to leave it on your favourite repeater.

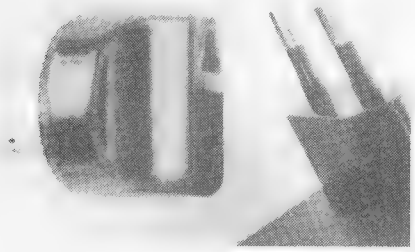
ANTENNA

The rubber ducky antenna supplied worked as well as any other I have tried, and put in adequate signals



The LS-202E at 146MHz — high power.

to several repeaters from the Box Hill area, and also from Mt Evelyn. I much prefer to use a real antenna on my rigs though. With the optional SH-1 speaker/microphone, the little rig can be hung on a belt with the belt clip, and only a light weight extra need be held. It's much easier to carry that way.



Power Plugs.

POWER

Now for power supplies. Belcom claim that maximum DC supply voltage is 12 volts. As such it should never be operated directly from a car battery or catastrophic rig failure may result. It runs on a nominal 9 volts, or for higher power operation 10.8 volts. The optional CA-110E AC charger supplied for the review was rated at 220 volts AC input, and had a non standard plug on it. As it is a plug pack type of supply, it needs an adaptor to fit it to Australian AC outlets. The charger tends to run a little warm, so it may have a limited life when run on 240 volts. The rig may be used while being charged.

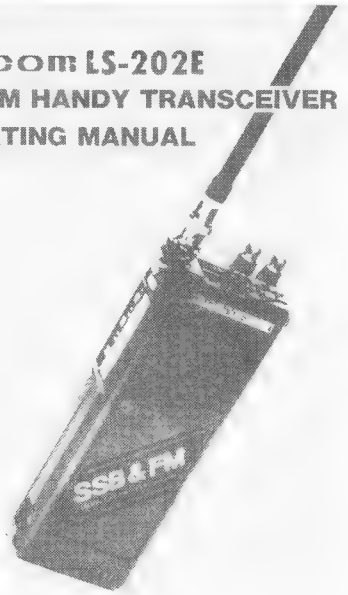
OPERATIONAL BOOK

The instruction book seemed to say all that was necessary for normal use, except for the instructions that came with the SH-1 which were in Japanese, but operation is so simple as to not need interpretation.

CONCLUSIONS

This rig would seem to fit the bill for someone who wants a light weight multi mode two metre hand held, and doesn't mind not having scanning or memory functions like some of the FM only opposition. It does have shortcomings in its operation due to its type of

Belcom LS-202E
SSB&FM HANDY TRANSCEIVER
OPERATING MANUAL



frequency selection, but it can be very useful even so. It would be very useful for a traveller who likes to use both SSB and FM, but cannot find room for the larger multi mode rigs. Power and receiver sensitivity are adequate for most needs. I would suggest you try one and make up your own mind.

AR

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THE WORLD CLASS COMPACT MOBILE

When the engineers at ICOM designed the IC-47A, they knew you would have almost no room to mount it. Take a good look at the dashboard in your car. ICOM have packed a processor controlled, 25 watt UHF mobile into just 58 cubic inches. Think about it, your IC-22S is 87 cubic inches and it doesn't rank in the same class. The 47A offers 32 CTCSS frequencies, scanning, memories, even a speech synthesizer to aid blind operators.

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The World System
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IC 003

VK3BFG RTTY — MORSE

Peter Cossins VK3BFG
14 Coleman Road, Wantirna South, Vic 3152

If you wish to relieve yourself of the old clanking Baudot machine in the amateur shack and you have a VDU or a quieter, more modern ASCII Teleprinter, an ASCII Keyboard and a Computer Lineprinter, this project may be of interest to you. It is not absolutely "state of the art" as far as microprocessor systems go but it works in both modes (Morse and RTTY) and is relatively cheap.

```
00010                    NAM    RTTYMORSE
00020 0000               ORG    $0000
00030                    OPT    NOG
00040                *
00050                *VERSION3
00060                *
00070                *PROGRAM TO CONVERT BAUDOT TO ASCII
00080                *AND MORSE TO ASCII WITH MODES
00090                *SELECTED BY KEYBOARD
00100                *
00110                *P.COSSINS
00120                *VK3BFG
00130                *
00140                *ACKNOWLEDGMENT TO KEN PALLISER
00150                *VK3GJ FOR LOOK-UP TABLES
00160                *
00170                *RTTY MODE
00180                *
00190                *SYSTEM VARIABLES
00200                *
00210 0000 0002     FSTACK RMB    2
00220 0002 0002     PSTACK RMB    2
00230 0004 0002     XSTACK RMB    2
00240 0006 0001     TXCNT  RMB    1
00250 0007 0001     RXCNT  RMB    1
00260 0008 0001     AUTCR  RMB    1
00270 0009 0001     RTTYM  RMB    1
00280 000A 0001     NOSTR  RMB    1
00290 000B 0001     FIGLET RMB    1
00300 000C 0001     SHIFT  RMB    1
00310 000D 0001     RXCH   RMB    1
00320 000E 0001     TXCH   RMB    1
00330                *
00340                *SYSTEM EQUATES
00350                *
00360 8004               ORG    $8004
00370                *
00380 8004 0001     PIAD   RMB    1
00390 8005 0001     PIAC   RMB    1
00400 8006 0001     PIBD   RMB    1
00410 8007 0001     PIBC   RMB    1
00420                *
00430 8040               ORG    $8040
00440                *
00450 8040 0001     ACIAS  RMB    1
00460 8041 0001     ACIAD  RMB    1
00470                *
00480      007F     SPOINT EQU    $007F
00490      0050     FIFTOP EQU    $0050
00500      000F     ENDFIF EQU    $000F
00510                *
00520                *SYSTEM INITIALISATION
00530                *
00540 E000               ORG    $E000
00550                *
00560 E000 01       INIT   NOP
00570 E001 0F              SEI              TEMPORARILY MASK IRQ
00580 E002 01              NOP
00590 E003 86 00           LDA A  #$00
00600 E005 B7 8005         STA A  PIAC
00610 E008 B7 8007         STA A  PIBC      CLR CNTRL REGS
00620 E00B B7 8004         STA A  PIAD      A SIDE IN
00630 E00E C6 FF           LDA B  #$FF
00640 E010 F7 8006         STA B  PIBD      B SIDE OUT
00650 E013 86 16           LDA A  #%00010110
00660 E015 B7 8005         STA A  PIAC      SET UP FOR RTTY
00670 E018 C6 3F           LDA B  #%00111111
00680 E01A F7 8007         STA B  PIBC      SET UP FOR RTTY
00690 E01D 86 03           LDA A  #$03
00700 E01F B7 8040         STA A  ACIAS     RESET ACIA
00710 E022 C6 D1           LDA B  #$D1      8 CHARS 2 STOP IRQ
00720 E024 F7 8040         STA B  ACIAS     NO PARITY DIVIDE BY 16
00730 E027 8E 007F         LDS    #SPOINT
00740 E02A 86 20           LDA A  #32       SET RECEIVE ****
00750 E02C 97 0D           STA A  RXCH
00760 E02E C6 40           LDA B  #64       SET TRANSMIT ****
00770 E030 D7 0E           STA B  TXCH
00780                *
00790 E032 CE E0D6 LDM     LDX    #MESS1
00800 E035 BD E0CA         JSR    OUTM
00810 E038 8D 3C           BSR    INCH
00820 E03A 81 52           CMP A  #$52      R=RTTY!
00830 E03C 27 0C           BEQ    RTTY
00840 E03E 81 4D           CMP A  #$4D      M=MORSE!
00850 E040 27 02           BEQ    MORSE
00860 E042 20 EE           BRA    LDM       INCORRECT RESPONSE!
00870 E044 7F 0009 MORSE   CLR    RTTYM
00880 E047 7E E45B         JMP    GOM
00890 E04A C6 01   RTTY    LDA B  #$01
00900 E04C D7 09           STA B  RTTYM     SET FOR RTTY
00910 E04E CE F0FE         LDX    #MESS2
00920 E051 BD F01A         JSR    OUTM
00930 E054 8D 20           BSR    INCH
00940 E056 81 4E           CMP A  #$4E      N=NO AUTO
00950 E058 27 0C           BEQ    NOAUT
00960 E05A 81 59           CMP A  #$59      Y=AUTO
00970 E05C 27 02           BEQ    YAUT
00980 E05E 20 EA           BRA    RTTY      INCORRECT RESPONSE!
00990 E060 C6 01   YAUT    LDA B  #$01
01000 E062 D7 08           STA B  AUTCR     SET FLAG
01010 E064 20 03           BRA    TXRX
01020 E066 7F 0008 NOAUT   CLR    AUTCR
01030 E069 B6 8004 TXRX    LDA A  PIAD
01040 E06C 85 20           BIT A  #%00100000
01050 E06E 27 03           BEQ    TX        TX=0!
01060 E070 7E E2E7 RX      JMP    GORX
01070 E073 7E E14F TX      JMP    GOTX
01080                *
01090 E076 F6 8040 INCH    LDA B  ACIAS
01100 E079 57              ASR B
01110 E07A 24 FA           BCC    INCH
01120 E07C B6 8041         LDA A  ACIAD
01130 E07F 84 7F           AND A  #$7F
01140 E081 39              RTS
01150                *
01160 E082 F6 8040 INC     LDA B  ACIAS
01170 E085 57              ASR B
01180 E086 B6 8004         LDA A  PIAD
01190 E089 85 20           BIT A  #$20      TX OR RX?
01200 E08B 27 03           BEQ    GON
01210 E08D 7E E2E7         JMP    GORX
01220 E090 24 F0   GON     BCC    INC
01230 E092 B6 8041         LDA A  ACIAD
01240 E095 84 7F           AND A  #$7F
01250 E097 81 0D           CMP A  #$0D
01260 E099 27 1A           BEQ    RESRX
01270 E09B 81 0A           CMP A  #$0A
01280 E09D 27 16           BEQ    RESRX
01290 E09F 7A 0007         DEC    RXCNT
01300 E0A2 27 07           BEQ    GOLF
01310 E0A4 D6 07           LDA B  RXCNT
01320 E0A6 C1 06           CMP B  #6
01330 E0A8 23 10           BLS    TSPA
01340 E0AA 39              RTS
01350 E0AB 36      GOLF    PSH A
01360 E0AC 86 0D           LDA A  #$0D
01370 E0AE 8D 0F           BSR    OUTCH
01380 E0B0 86 0A           LDA A  #$0A
01390 E0B2 8D 0B           BSR    OUTCH
01400 E0B4 32              PUL A
01410 E0B5 D6 0D   RESRX   LDA B  RXCH
01420 E0B7 D7 07           STA B  RXCNT
01430 E0B9 39              RTS
01440 E0BA 81 20   TSPA    CMP A  #$20
01450 E0BC 27 ED           BEQ    GOLF
01460 E0BE 39              RTS
```

Programme continued p18

IDENT OR VO
ICE IS NOT RETRANSMITTED. TIMEOU
T . THE REPEATER WILL TIMEOUT IF
OVERS EXCEED 10 MINS. OWNED AND
OPERATED BY THE EMDRC ON BEHALF
OF THE WIA INQUIRIES - TO KEN
VK3GJ QTHR. DE VK3RTY
READY TO TRANSMIT!
THIS IS VK3BFG RTTYMORSE TRANSM
ITTING BAUDOT CODE AT 45.5 BAUD.

The design was dictated by the devices I could find in the junk box, as so often is the case, with equipment homebrewed by amatuers. If you wish to be more 'with it' the UART used in the design could be replaced by a more modern software programmable VIA. The software would need some minor adjustments to accommodate the new hardware lineup and obviously the printed circuit board layout would also need some surgery. There are a few Bytes of unused space in the ROM which could be used for additional keyboard control by the inclusion of appropriate routines within the software.

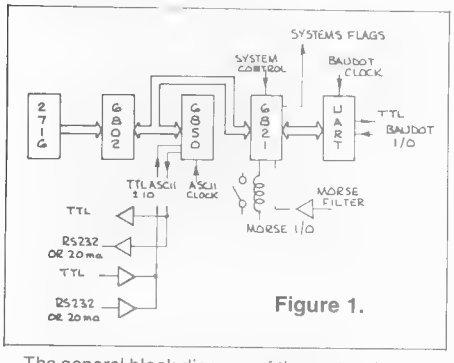


Figure 1.

The general block diagram of the system is shown in Fig 1. The 6850 ACIA accepts serial ASCII data at TTL level and is the interface between the VDU or ASCII teleprinter and the microprocessor. The 6821 PIA is used for control and flag functions in both the RTTY and Morse modes and also drives the UART in the RTTY mode. The UART performs the parallel to serial and serial to parallel conversion of the Baudot data.

The 2716 ROM contains the control software for the whole system and the 6802 is the microprocessor with 128 Bytes of on-board RAM. 555 clocks were used for both the Baudot and ASCII ports; again the junk box rules. Other clock systems can be used if you wish a wider selection of code speeds.

The software is a conglomerate of self written, re-assembled and modified routines from amateur sources.

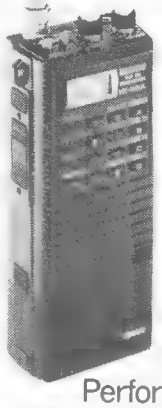
In particular, the very clever ASCII-Baudot look-up tables originated from Ken Palliser VK3GJ as written for the RTTY repeater in Melbourne. A complete listing of software and associated flowcharts are provided for those who wish to hand load a ROM or conduct modifications to suit their own particular application.

I am prepared to programme 2716 ROMs if you send me a clean 2716 and a suitable SAE or jiffy bag for return mail. As the software can accommodate a variety of line formats you should also indicate the number of characters in a line in your system. I can also 'customise' the ROM with your own name if required.

The wiring of the system requires normal good soldering techniques but is fairly non-critical, but of course like all computers there is quite a lot of it to be done if you decide to use veroboard or similar. I have not included the microprocessor system wiring in this article so if you decide to go that way you need to be

Continued p19

THE WORLD CLASS 2 METRE HAND HELD



ICOM built this portable to last. Did you know that the IC-02A can safely dissipate 5 watts* of power.

The IC-02A uses a modular output device making it extremely efficient, and very reliable. Performance is better than one may expect for such a small package. Check it out at one of our distributors, ask him to demonstrate priority scan, the selectable steps and the other many features of the 02A, we think you'll be amazed.

*5 watts available with optional battery pack

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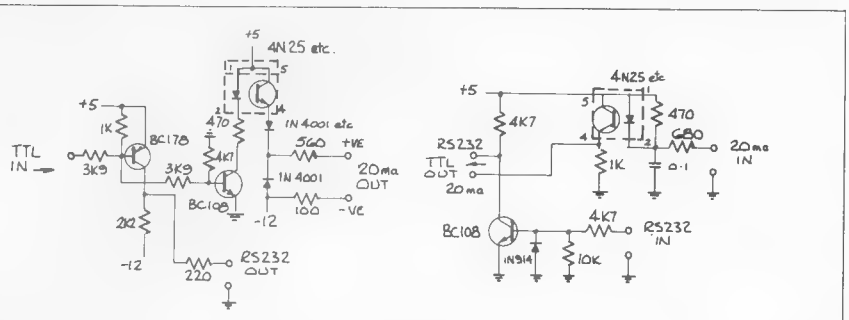
IC002

VK3BFG RTTY — MORSE

```
01470                   *
01480 E0BF F6 8040 OUTCH  LDA B  ACIAS
01490 E0C2 57             ASR B
01500 E0C3 57             ASR B
01510 E0C4 24 F9          BCC    OUTCH
01520 E0C6 B7 8041        STA A  ACIAD
01530 E0C9 39             RTS
01540                   *
01550 E0CA A6 00    OUTM  LDA A  $0,X
01560 E0CC 81 04          CMP A  #$04
01570 E0CE 27 05          BEQ    ENDM
01580 E0D0 8D ED          BSR    OUTCH
01590 E0D2 08             INX
01600 E0D3 20 F5          BRA    OUTM
01610 E0D5 39       ENDM  RTS
01620                   *
01630 E0D6 0D       MESS1 FCB    $0D,$0A,$0A
01640 E0D9 56             FCC    /VK3BFG RTTYMORSE/
01650 E0E9 0D             FCB    $0D,$0A,$0A
01660 E0EC 4D             FCC    /MORSE OR RTTY?/
01670 E0FA 0D             FCB    $0D,$0A,$0A
01680 E0FD 04             FCB    $04
01690 E0FE 0D       MESS2 FCB    $0D,$0A,$0A
01700 E101 41             FCC    /AUTO CR AND LF?/
01710 E110 0D             FCB    $0D,$0A,$0A
01720 E113 04             FCB    $04
01730 E114 0D       MESS3 FCB    $0D,$0A,$0A
01740 E117 52             FCC    /READY TO TRANSMIT!/
01750 E129 0D             FCB    $0D,$0A,$0A
01760 E12C 04             FCB    $04
01770 E12D 0D       MESS4 FCB    $0D,$0A,$0A
01780 E130 52             FCC    /RECEIVING!/
01790 E13A 0D             FCB    $0D,$0A,$0A
01800 E13D 04             FCB    $04
01810 E13E 0D       MESS5 FCB    $0D,$0A,$0A
01820 E141 46             FCC    /FIFO FULL!/
01830 E14B 0D             FCB    $0D,$0A,$0A
01840 E14E 04             FCB    $04
01850                   *
01860                   *TRANSMIT ROUTINE
01870                   *
01880 E14F 8E 007F  GOTX  LDS    #SPOINT   RESET STACK
01890 E152 CE 0050        LDX    #FIFTOP
01900 E155 DF 00          STX    FSTACK    RESET FSTACK
01910 E157 C6 01          LDA B  #$01
01920 E159 D7 0A          STA B  NOSTR
01930 E15B 96 0E    GOON  LDA A  TXCH
01940 E15D 97 06          STA A  TXCNT     SET TX COUNT
01950 E15F 96 0D          LDA A  RXCH
01960 E161 97 07          STA A  RXCNT
01970 E163 C6 04          LDA B  #%00000100
01980 E165 F7 8006        STA B  PIRD      SET TX FLAG
01990 E168 86 04          LDA A  #$04      TIME DELAY
02000 E16A CE FFFF  DEL1  LDX    #$FFFF
02010 E16D 09       DEL   DEX
02020 E16E 26 FD          BNE    DEL
02030 E170 4A             DEC A
02040 E171 26 F7          BNE    DEL1
02050 E173 86 14          LDA A  #%00010100
02060 E175 8D 08          BSR    GOB       SEND BAUDOT CR
02070 E177 86 44          LDA A  #%01000100
02080 E179 8D 04          BSR    GOB
02090 E17B 8D 02          BSR    GOB       SEND 2 BAUDOT LF
02100 E17D 20 19          BRA    CONT
02110                   *
02120 E17F B7 8006  GOB   STA A  PIRD      DUMP CHAR
02130 E182 C6 37          LDA B  #$37
02140 E184 F7 8007        STA B  PIBC      CB2 LOW TDS
02150 E187 01             NOP
02160 E188 C6 3F          LDA B  #$3F
02170 E18A F7 8007        STA B  PIBC      CB2 HIGH
02180 E18D F6 8006        LDA B  PIRD      CLEAR IRQB!
02190 E190 F6 8007  RDY   LDA B  PIBC
02200 E193 C5 80          BIT B  #$80      READY?
02210 E195 27 F9          BEQ    RDY
02220 E197 39             RTS
02230                   *
02240 E198 CE E114  CONT  LDX    #MESS3
02250 E19B BD E0CA        JSR    OUTM
02260                   *
02270 E19E BD E082  GET   JSR    INC       GET FIRST BYTE
02280 E1A1 BD E0BF        JSR    OUTCH     ECHO IT
02290 E1A4 85 40          BIT A  #$40      FIG OR LTR?
02300 E1A6 26 04          BNE    LTRS
02310 E1A8 C6 6C          LDA B  #$6C      GET FIG SHIFT
02320 E1AA 20 02          BRA    SET
02330 E1AC C6 7C    LTRS  LDA B  #$7C      GET LTR SHIFT
02340 E1AE D7 0C    SET   STA B  SHIFT
02350 E1B0 D6 0E          LDA B  AUTCR
02360 E1B2 C5 01          BIT B  #$01
02370 E1B4 27 08          BEQ    GORTY
02380 E1B6 81 0D          CMP A  #$0D      CR?
02390 E1B8 27 E4          BEQ    GET
02400 E1BA 81 0A          CMP A  #$0A      LF?
02410 E1BC 27 E0          BEQ    GET
02420 E1BE 8D 69    GORTY BSR    FINDB     NO STORE!
02430 E1C0 7F 000A        CLR    NOSTR
02440 E1C3 8D F2D3        JSR    DUMP      DUMP FIRST CHAR!
02450 E1C6 7A 0006        DEC    TXCNT
02460 E1C9 F6 8006        LDA B  PIBD      CLEAR IRQB!
02470 E1CC F6 8041        LDA B  ACIAD     CLEAR ACIA IRQ!
02480 E1CF 0E             CLI              CLEAR IRQ MASK
02490                   *
02500 E1D0 B6 8004  TSTRX LDA A  PIAD
02510 E1D3 85 20          BIT A  #$20      RX?
02520 E1D5 27 F9          BEQ    TSTRX
02530 E1D7 7E E2F7        JMP    GORX
02540                   *
02550 E1DA 96 09    IRQA  LDA A  RTTYM
02560 E1DC 85 01          BIT A  #$01
02570 E1DE 26 03          BNE    IRQON
02580 E1E0 7E E4AC        JMP    IRUM
02590 E1E3 F6 8040  IRQON LDA B  ACIAS
02600 E1E6 C5 80          BIT B  #$80      IRQA?
02610 E1E8 26 03          BNE    GOA
02620 E1EA 7E E28B  GORR  JMP    IRQB
02630 E1ED BD E0B7  GOA   BSR    INC       GET BYTE
02640 E1F0 BD E0BF        JSR    OUTCH
02650 E1F3 D6 0E          LDA B  AUTCR
02660 E1F5 C5 01          BIT B  #$01
02670 E1F7 26 04          BNE    CRLF
02680 E1F9 8D 2E    FBAUD BSR    FINDB     FIND AND STORE
02690 E1FB 20 FD          BRA    GOAB
02700 E1FD 81 0D    CRLF  CMP A  #$0D      CR?
02710 E1FF 27 E9          BEQ    GOAB
02720 E201 81 0A          CMP A  #$0A      LF?
02730 E203 27 E5          BEQ    GOAB
02740 E205 8D 02          BSR    CRLFS
02750 E207 20 F0          BRA    FBAUD
02760                   *
02770 E209 7A 0006  CRLFS DEC    TXCNT
02780 E20C 27 0C          BEQ    SAVE
02790 E20E D6 06          LDA B  TXCNT
02800 E210 C1 06          CMP B  #6
02810 E212 23 01          BLS    TESTS
02820 E214 39             RTS
02830 E215 81 20    TESTS CMP A  #$20
02840 E217 27 01          BEQ    SAVE
02850 E219 39             RTS
02860 E21A 36       SAVE  PSH A              SAVE ASCII BYTE
02870 E21B 86 08          LDA A  #$08      BAUDOT CR
02880 E21D 8D 46          BSR    STORE
02890 E21F 86 20          LDA A  #$20      BAUDOT LF
02900 E221 8D 42          BSR    STORE
02910 E223 32             PUL A            GET ASCII BYTE
02920 E224 D6 0F          LDA B  TXCH
02930 E226 D7 06          STA B  TXCNT
02940 E228 39             RTS
02950                   *
02960 E229 CE E37C  FINDB LDX    #TABLE
02970 E22C A1 00    LOKBDT CMP A  $0,X
02980 E22E 26 0F          BNE    STEP1
02990 E230 C6 7C          LDA B  #$7C
03000 E232 D1 0C          CMP B  SHIFT
03010 E234 27 05          BEQ    SENDIT
03020 E236 D7 0C          STA B  SHIFT
03030 E238 17             TBA
03040 E239 8D 2A          BSR    STORE
03050 E23B A6 02    SENDIT LDA A  $2,X
03060 E23D 20 1D          BRA    OUT
03070 E23F A1 01    STEP1 CMP A  $1,X
03080 E241 26 0D          BNE    STEPON
03090 E243 C6 6C          LDA B  #$6C
03100 E245 D1 0C          CMP B  SHIFT
03110 E247 27 F2          BEQ    SENDIT
03120 E249 D7 0C          STA B  SHIFT
03130 E24B 17             TBA
03140 E24C 8D 17          BSR    STORE
03150 E24E 20 EB          BRA    SENDIT
03160 E250 08       STEPON INX
03170 E251 08             INX
03180 E252 08             INX
03190 E253 8C E3D6        CPX    #TABEND
03200 E256 27 02          BEQ    EXTOUT    NOT FOUND!
03210 E258 20 D2          BRA    LOKBDT
03220 E25A 86 7C    EXTOUT LDA A  #$7C      SEND LTR SHIFT!
03230 E25C D6 0A    OUT   LDA B  NOSTR
03240 E25E C1 01          CMP B  #$01      FIRST CHAR?
03250 E260 27 02          BEQ    ENDF
03260 E262 20 01          BRA    STORE
03270 E264 39       ENDF  RTS
03280                   *
03290 E265 FF 04    STORE STX    XSTACK
03300 E267 9E C2          STS    FSTACK
03310 E269 9E 00          LDS    FSTACK
03320 E26B 36             PSH A
03330 E26C 9F 00          STS    FSTACK
03340 E26E DE 00          LDX    FSTACK
03350 E270 8C 000F        CPX    #ENDFIF
03360 E273 26 11          BNE    OUTS
03370 E275 C6 06    FULL  LDA B  #$06
03380 E277 F7 8006        STA B  PIBD      FLAG IT TX ON
03390 E27A CE E13E        LDX    #MESS5
```

Programme continued p20



20mA — RS232 Interface.

familiar with 6800 systems or find someone who can fill in the details[1].

I recommend using the printed circuit board as provided as this leaves little source for error. My unit was actually wired on a micro-system prototype board but working units have been made using the final layout so it is not unproven. Note that the layout is positive and hence could be used as a photocopy transparency master for use with positive resist available from your local hobby shop.

Talking of printed circuit boards, Keith Haslam of Eastern Communications has a few available that he has populated. Give Keith a call if you are interested and if there is sufficient demand Keith may be able to supply PCBs only as well.

Full size PCB Layout on page 26.

PLEASE NOTE

Some PIAs exhibit faulty reading of the CA2 line; which is used to indicate Baudot data is ready for transfer to the 6821 from the UART. A modification is shown on the circuit diagram using a spare gate on the board. Cut the track between pin 6 of the appropriate 7400 and pin 39 of the PIA: Rewire as shown and all should be well.

FRONT PANEL MODES AND OPERATION

1 45.5/50 Baudot speed select. For amateur operation select 45.5. For commercial RTTY select 50.
2 110/300 ASCII speed selection is dependent on the VDU or teleprinter used. Other speeds are possible by suitable modification to the ASCII clocks on the board.
3 SPEED — Controls the speed of Morse in the transmit mode.
4 FILTER — Selects the 200 Hz, 40 Hz or processed CW audio from the receiver.
5 PHONES — Headphone output for tuning Morse.
6 MORSE LED — Output indicating correct tuning of the receiver for Morse.
7 FIFO LED — Output indicating storage buffer full. (This is also printed out on the VDU or ASCII teleprinter.)
8 TX LED — Output indicating transmit mode in both RTTY and Morse.
9 RX LED — Output indicating receive mode in both RTTY and Morse.
10 UNSHIFT — Controls the selection of unshift on space in the RTTY mode. Normally I leave this on.

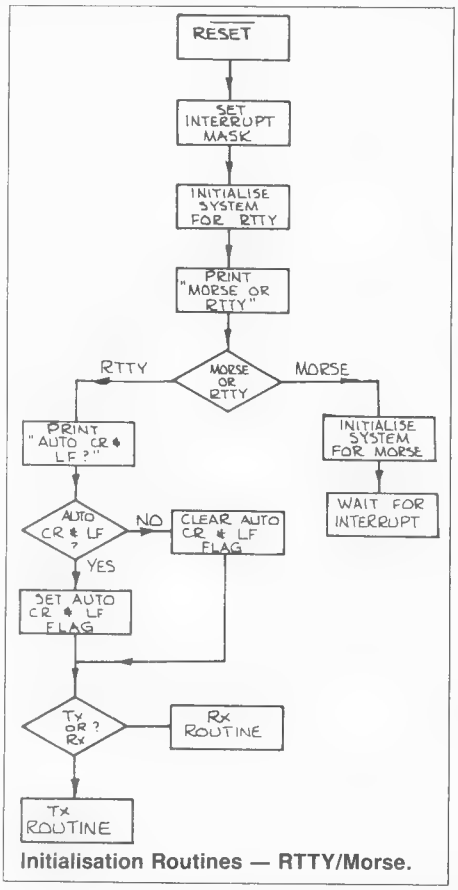
KEYBOARD OPERATION

The unit will automatically initialise when the power is switched on. Providing the ASCII clock is correct, the system will print 'VK3BFGRTTYMORSE' and then the question 'MORSE OR RTTY?'

There are only two valid responses.

Type the letter M — the system will initialise into the Morse mode and the VDU or teleprinter will print 'READY'.

In this mode the unit is automatically in receive but will go to transmit if any valid key is depressed There are a number of ASCII codes that have no equivalent in Morse. If any of these keys are depressed the print will be an ASCII 'hash' and the system will remain in the receive mode. The unit is therefore set up for full break in operation for Morse code.



Initialisation Routines — RTTY/Morse.

Tuning of the receiver is quite critical. Listen on the headphones in the 200 Hz position of the filter switch. Centre the tuning and repeat in the 40 Hz and processed positions. The processed audio is a hard tone and with a little bit of practice you can recognise when the tuning is correct. Like all computer Morse receivers the accuracy of the print out is dependent on the quality of the Morse sent.

Type the letter R — the system will print out the question 'AUTO CR AND LF?' Again there are only two valid responses.

Type the letter Y — the system will automatically send CR and LF to you and the receiving station.

Type the letter N — the system will send CR and LF when those keys are depressed on your VDU or teleprinter.

In both modes any invalid response will simply cause a repeat of the previous printout.

Transmit and receive in the RTTY mode is controlled by a switch in my modem to pin 7 of the 6821 in the RTTYMORSE unit.

If you are starting from scratch there is no reason why the RTTYMORSE unit and the modem should not be in the same box.

Continued p21

THE WORLD CLASS UHF HAND HELD

Did you know that ICOM build this hand-held in a sealed case? With squelch sensitive below 0.1μV, and over 2.5 watts output, the processor controlled features of this portable become essential in searching for that elusive QSO. Priority scan in selectable increments and 10 memories are just a few features that fit comfortably into your hand. UHF opens a whole new experience for you, the IC-04A is built to help.

ICOM
The World System
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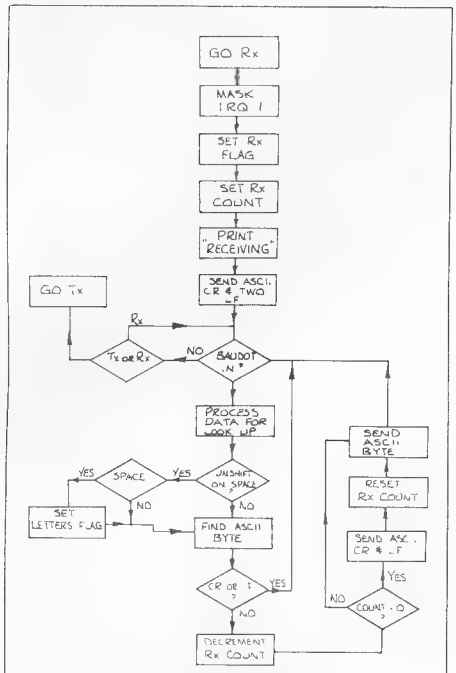
ICO01

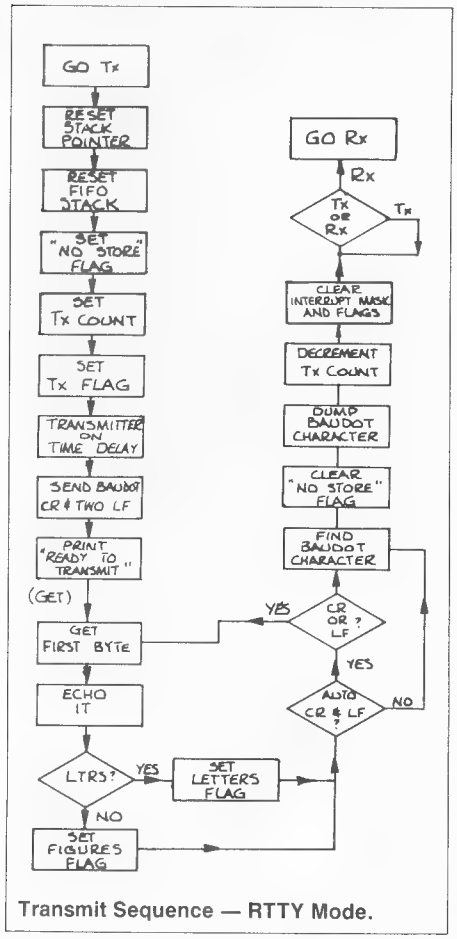
VK3BFG RTTY — MORSE

```
03400 E27D BD E0CA        JSR    OUTM
03410 E280 CE FFFF        LDX    #$FFFF
03420 E283 09       DEL2  DEX
03430 E284 26 FD          BNE    DEL2
03440 E286 9E 02    OUTS  LDS    FSTACK

03450 E288 DE 04          LDX    XSTACK
03460 E28A 39             RTS
03470               *
03480 E28B B6 8007 IRQB   LDA A  PIBC
03490 E28E 85 80          BIT A  #$80
03500 E290 27 1F          BEQ    ENDI
03510 E292 DF 00          STX    FSTACK
03520 E294 8C 0050        CPX    #FIFTOP
03530 E297 27 1C          BEQ    ENDQ       NO DATA IN STORE!
03540 E299 C6 04          LDA B  #$04
03550 E29B F7 8006        STA B  PIBD       CLR FIFO FLAG TX ON
03560 E29E 96 50    GETF  LDA A  FIFTOP     GET BAUDOT CHAR
03570 E2A0 8D 31          BSR    DUMP
03580 E2A2 CE 0050        LDX    #FIFTOP
03590 E2A5 09       DLOOP DEX
03600 E2A6 E6 00          LDA B  $0,X
03610 E2A8 E7 01          STA B  $1,X
03620 E2AA 9C 00          CPX    FSTACK
03630 E2AC 26 F7          BNE    DLOOP
03640 E2AE 7C 0001        INC    FSTACK+1
03650 E2B1 F6 8006 ENDI   LDA B  PIBD       CLEAR IRQB!
03660 E2B4 3B             RTI
03670 E2B5 BD E082 ENDQ   JSR    INC        GET BYTE
03680 E2B8 BD E0BF        JSR    OUTCH      ECHO IT
03690 E2BB D6 08          LDA B  AUTCR
03700 E2BD C5 01          BIT B  #$01       AUTO?
03710 E2BF 26 05          BNE    INTCR
03720 E2C1 BD E229 INTF   JSR    FINDB      FIND AND STORE!
03730 E2C4 20 D8          BRA    GETF
03740               *
03750 E2C6 81 0D    INTCR CMP A  #$0D
03760 E2C8 27 EB          BEQ    ENDQ
03770 E2CA 81 0A          CMP A  #$0A
03780 E2CC 27 E7          BEQ    ENDQ

03790 E2CE BD E209        JSR    CRLFS
03800 E2D1 20 EE          BRA    INTF
03810               *
03820 E2D3 48       DUMP  ASL A
03830 E2D4 84 F8          AND A  #$F8       MASK 3 LSB
03840 E2D6 8A 04          ORA A  #$04
03850 E2D8 B7 8006        STA A  PIBD       DUMP,CLR FIFO FLAG TX ON
03860 E2DB C6 37          LDA B  #$37
03870 E2DD F7 8007        STA B  PIBC       CB2 LOW TDS
03880 E2E0 01             NOP
03890 E2E1 C6 3F          LDA B  #$3F
03900 E2E3 F7 8007        STA B  PIBC       CB2 HIGH
03910 E2E6 39             RTS
03920               *RECEIVE ROUTINE
03930               *
03940 E2E7 01       GORX  NOP
03950 E2E8 0F             SEI
03960 E2E9 01             NOP
03970 E2EA 7F 8006        CLR    PIBD       RX FLAG ON!
03980 E2ED 7F 000B        CLR    FIGLET     ASSUME FIRST CHAR IS A LTR!
03990 E2F0 96 0D          LDA A  RXCH
04000 E2F2 97 07          STA A  RXCNT      SET RX COUNT
04010 E2F4 CE E12D        LDX    #MESS4
04020 E2F7 BD E0CA        JSR    OUTM
04030               *
04040 E2FA F6 8004 RXING  LDA B  PIAD
04050 E2FD C5 20          BIT B  #$20       TX?
04060 E2FF 27 02          BEQ    TXING
04070 E301 20 03          BRA    RXON
04080 E303 7E E14F TXING  JMP    GOTX
04090 E306 F6 8005 RXON   LDA B  PIAC
04100 E309 C5 40          BIT B  #$40       CA2 FLAG?
04110 E30B 27 ED          BEQ    RXING      NO INCOMING DATA!
04120 E30D B6 8004        LDA A  PIAD       GET BAUDOT CHAR
04130 E310 48             ASL A
04140 E311 48             ASL A
04150 E312 84 7F          AND A  #$7F       MASK!
04160 E314 F6 8004        LDA B  PIAD
04170 E317 C5 40          BIT B  #$40       TEST UNSHIFT!
04180 E319 27 07          BEQ    FINDA
04190 E31B 81 10          CMP A  #$10       BAUDOT SPACE?
04200 E31D 26 03          BNE    FINDA
04210 E31F 7F 000B        CLR    FIGLET     SET LTRS!
04220               *
04230 E322 CE E376 FINDA  LDX    #TABLE
04240 E325 A1 02    LOKASC CMP A  $2,X
04250 E327 27 0A          BEQ    FNDASC
04260 E329 08             INX
04270 E32A 08             INX
04280 E32B 08             INX
04290 E32C 8C E3D6        CPX    #TABEND
04300 E32F 27 0F          BEQ    NOTFND
04310 E331 20 F2          BRA    LOKASC
04320 E333 7D 000B FNDASC TST    FIGLET
04330 E336 26 04          BNE    ISAFIG
04340 E338 A6 00          LDA A  $0,X       IS LETTER,GET IT!
04350 E33A 20 16          BRA    GOTASC
04360 E33C A6 01    ISAFIG LDA A  $1,X
04370 E33E 20 12          BRA    GOTASC
04380 E340 81 6C    NOTFND CMP A  #$6C
04390 E342 26 05          BNE    NFSHFT
04400 E344 7C 000B        INC    FIGLET
04410 E347 20 07          BRA    EXTREC
04420 E349 81 7C    NFSHFT CMP A  #$7C
04430 E34B 26 03          BNE    EXTREC
04440 E34D 7F 000B        CLR    FIGLET
04450 E350 20 A8    EXTREC BRA    RXING      NO VALID ASCII CHAR!
04460               *
04470 E352 81 0D    GOTASC CMP A  #$0D
04480 E354 27 08          BEQ    OUTA
04490 E356 81 0A          CMP A  #$0A
04500 E358 26 07          BNE    TESTRX
04510 E35A 86 20          LDA A  #$20
04520 E35C 20 03          BRA    TESTRX
04530 E35E 7E E2FA OUTA   JMP    RXING
04540 E361 7A 0007 TESTRX DEC    RXCNT
04550 E364 26 10          BNE    DUMPA
04560 E366 36             PSH A
04570 E367 86 0D          LDA A  #$0D
04580 E369 BD E0BF        JSR    OUTCH
04590 E36C 86 0A          LDA A  #$0A
04600 E36E BD E0BF        JSR    OUTCH
04610 E371 D6 0D          LDA B  RXCH
04620 E373 D7 07          STA B  RXCNT      RESET RX COUNT
04630 E375 32             PUL A
04640 E376 BD E0BF DUMPA  JSR    OUTCH
04650 E379 7E E2FA        JMP    RXING
04660               *
04670 E37C 41       TABLE FCB    $41,$2D,$60,$42,$3F,$4C
04680 E380 43             FCB    $43,$3A,$38,$44,$23,$48
04690 E382 45             FCB    $45,$33,$40,$46,$25,$58
04700 E388 47             FCB    $47,$24,$2C,$48,$2A,$14
04710 E38E 49             FCB    $49,$38,$30,$4A,$07,$68
04720 E394 4B             FCB    $4B,$28,$78,$4C,$29,$24
04730 E39A 4D             FCB    $4D,$2E,$1C,$4E,$2C,$18
04740 E3A0 4F             FCB    $4F,$39,$0C,$50,$30,$34
04750 E3A6 51             FCB    $51,$31,$74,$52,$34,$28
04760 E3AC 53             FCB    $53,$27,$50,$54,$35,$04
04770 E3B2 55             FCB    $55,$37,$70,$56,$3D,$3C
04780 E3B8 57             FCB    $57,$32,$64,$58,$2F,$5C
04790 E3BE 59             FCB    $59,$36,$54,$5A,$2B,$44
04800 E3C4                *MACHINE CHARACTERS
04810 E3CA 0D             FCB    $0D,$0D,$08,$0A,$0A,$20
04820 E3D0 20             FCB    $20,$20,$10,$5E,$5E,$00
04830 E3D6 00       TABEND FCB   $00
04840               *
04850               *MORSE MODE
04860               *
04870               *SYSTEM VARIABLES
04880               *
04890 0010                 ORG    $0010
04900               *
04910 0010 0002     CVCX   RMB    2
04920 0012 0002     SAVEX  RMB    2
04930 0014 0001     COUNT  RMB    1
04940 0015 0001     RESMSK RMB    1
04950 0016 0001     BUFLAG RMB    1
04960 0017 0001     COSTA  RMB    1
04970 0018 0001     LETYPE RMB    1
04980 0019 0001     HLETIM RMB    1
04990 001A 0001     TLETIM RMB    1
05000 001B 0001     SPEEDK RMB    1
05010 001C 0001     RCHAR  RMB    1
05020 001D 0001     LDATIM RMB    1
05030 001E 0001     TQLDAT RMB    1
05040 001F 0001     TLDAT  RMB    1
05050 0020 0001     KDTIM  RMB    1
05060 0021 0001     KUTIM  RMB    1
05070 0022 0001     CHCTR  RMB    1
05080 0023 0001     RECX   RMB    1
05090 0024 0040     BUFBOT RMB    64
05100 0064 0001     BUFTOP RMB    1
05110 0065 0001     RXCHM  RMB    1
05120               *
05130 E400                 ORG    $E400
05140               *
05150 E400 00       CODE   FCB    0,$B4,$BB,$54,$16,0,$14,0
05160 E408 01              FCB    1,0,0,0,0,$21,0,0
05170 E410 00              FCB    0,0,0,0,0,0,0,0
05180 E418 00              FCB    0,0,0,$44,0,0,0,0
05190 E420 21       RTAB   FCB    $21,0,$4A,0,0,0,0,$7A
05200 E428 B6              FCB    $B6,$B2,0,0,$CE,$B6,$56,$94
05210 E430 FC              FCB    $FC,$7C,$3C,$1C,$0C,4,$84,$C4
05220 E438 E4              FCB    $E4,$F4,$E2,$AA,0,$8C,0,$32
05230 E440 00              FCB    0,$60,$BB,$AB,$90,$40,$2B,$D0
05240 E448 08              FCB    $08,$20,$78,$B0,$48,$E0,$A0,$F0
05250 E450 68              FCB    $68,$D8,$50,$10,$C0,$30,$18,$70
05260 E458 98              FCB    $98,$B8,$C8
05270               *
05280               *INITIALISE FOR MORSE
05290               *
05300 E45B CE 007F GOM     LDX    #$7F       INIT MORSE
05310 E45E 6F 00   L1      CLR    0,X
```

Programme continued p22



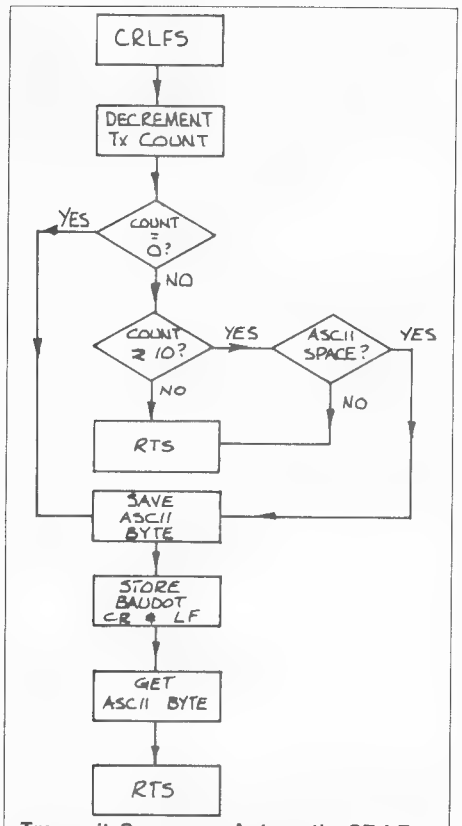
Receive Sequence — RTTY Mode.



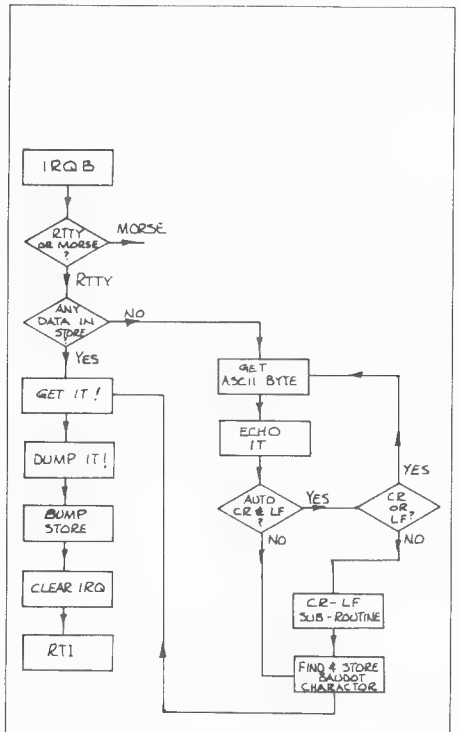
Transmit Sequence — RTTY Mode.

A short delay from receive to transmit is in-built in the system.

During this time the transmit key line will be active and an automatic CR and LF sent. 'READY TO TRANSMIT' and 'RECEIVING' printouts assist the operator.



Transmit Sequence Automatic CR-LF Subroutine — RTTY Mode.



Transmit Sequence IRQB Request — RTTY Mode.

Continued p23

ACCESSORIES FOR WORLD CLASS RADIOS

HF EQUIPMENT

IC-751	All band AM FM SSB CW & Gen Cov Rx 32 memories	
PS-35	Internal switched mode power supply	258 00
SM-6	Desk microphone	57 00
SM 8	Deluxe desk microphone	99 00
HM-12	Hand microphone with up/down scanning	29 00
EX310	Voice synthesizer module	68 00
RC 10	Frequency remote controlled unit	68 00
CR64	High stability Xtal	114 00
FL32	9 MHz CW/RTTY filter 500 Hz	56 50
FL63	9 MHz CW/RTTY narrow filter — 250 Hz	65 50
FL33	9 MHz AM filter – 6 kHz	53 00
FL70	9 MHz SSB wide filter 2.8 kHz	52 50
FL52A	455 kHz CW/RTTY filter — 500 Hz	110 00
FL53A	455 kHz CW/RTTY narrow filter — 250 Hz	110 00
IC-745	All band SSB AM (Rx only) Gen Cov Rx 16 memories	
PS35	Internal switched mode power supply	258 00
SM6	Desk microphone	57 00
SM8	Deluxe desk microphone	99 00
HM12	Hand microphone with up/down scanning	29 00
EX241	Marker unit	22 00
EX242	FM unit Tx & Rx	45 00
EX243	Curtis keyer unit	59 00
FL45	9 MHz CW filter - 500 Hz	65 50
FL44A	455 kHz SSB narrow filter 250 Hz	99 50
FL52A	455 kHz CW/RTTY filter — 500 Hz	110 00
FL53A	455 kHz CW/RTTY narrow filter — 250 Hz	110 00
FL54	9 MHz CW/RTTY narrow filter 270 Hz	65 50
IC-740	No longer available Accs still available	
SM5	Desk microphone	57 00
EX241	Marker unit	22 00
EX242	FM unit	45 00
EX243	Curtis keyer	59 00
IC 730	10-80 m compact transceiver	
PS15	External power supply 20 amps	215 00
SM5	Desk microphone	57 00
HM7	Hand microphone with pre amp	22 00
EX202	LDA unit for use with AT100/AT500	19 00
EX203	CW audio filter	20 00
EX205	Transverter unit	19 00
EX195	Marker unit	33 00
FL30	SSB pass band tune filter	56 00
FL44	455 kHz SSB filter 2.4 kHz	99 50
FL45	9 MHz CW filter	65 50
IC 720A	No longer available Accs still available	
PS15	External power supply 20 amps	215 00
CF1	Cooling fan for PS15	40 50
EX144	Mounting bracket for CF1	7 50
SM5	Desk microphone	57 00
FL32	CW narrow filter	56 50
FL34	AM Xtal filter	53 00
IC-R70	General coverage rece iver 2-30 MHz	
EX257	FM unit	51 00
FL63	CW narrow filter	65 50
FL44A	455 kHz SSB filter	99 50
CK70	DC cable kit	15 00
70720	Interface unit to transceiver with IC-720A	99 00
IC-R71A	All mode general coverage Rx keypad entry	
RC-11	Infra-red remote control unit	99 00
EX257	FM unit	51 00
CK70	DC cable kit	15 00
C-2KL		1749 00
IC-AT100	100 watt automatic antenna tuner	499 00
IC-A1500	500 watt automatic antenna tuner	620 00
IC-PS30	System power supply 25 amp continuous	375 00
IC AH1	Mobile antenna 3.5 MHz 30 MHz	299 00
C-CT10	Computer interface for 751, 745 271 R71A	499 00

VHF EQUIPMENT

IC 271A	Multi mode base station 25W, 32 memories	
IC-271H	High power version of above 100W	
PS25	Internal switched mode power supply 271A	189 00
PS35	Internal switched mode power supply 271H	258 00
EX310	Speech synthesizer unit	68 00
AG20	Internal receive pre amp 271A	95 00
AG25	Masthead receive pre-amp 271H	112 00
SM6	Desk microphone	57 00
IC-290H	25W multi-mode mobile, 5 memories	
C-27A	25W FM mobile 9 memories multi function	
C-27H	45W FM mobile, 9 memories multi-function	
UT16	Voice synthesizer unit	45 00
BU-1	Memory back-up unit for mobiles	39 50
IC 2A	Synthesized 2m FM hand held 1.5W	
IC-02A	Synthesized 2m FM hand held	
CA5	5/8 Telescopic gain antenna	24 00
ML1	10 watt booster unit for 2A	95 00
BP3	Standard battery pack	38 00
BP2	Low volt high	55 50
BP4	Empty battery pack (6 x AA size cells)	12 50
BP5	High volts high capacity (high power)	76 50
BP7	High volts high capacity (for use with 02A only) 5W	115 00
BP8	Low volts high capacity	105 00
DC 1	12V regulator pack (2A)	22 50
CP-1	12V charger lead for cigar lighter	7 50
FA-1	Helical antenna	12 00
LC-1	Carrying case (2A/BP5)	10 00
LC-2	Carrying case (2A/BP4)	10 00
LC-3	Carrying case (2A/BP3)	10 00
LCM 12	Heavy duty leather case (2A/BP2 3 4 5)	72 00
LC-11	Carrying case (02A/BP3)	15 00
LC-14	Carrying case (02A/BP7)	15 00
HS-10/SA	Head set with boom mic (VOX/02A only)	75 00
HS-10/SB	Head set with boom mic (NTT/2A 02A)	75 00
SS1	Shoulder strap	15 00
BC 36E	Desk top drop in charger (4 batt packs)	99 00
HM-9	Speaker microphone	

UHF EQUIPMENT

IC-471A	Multi-mode base station 25 watts 32 memories	
C-471H	High power version of above 75 watts	
PS25	Internal power supply for C 471A	189 00
EX310	Voice synthesizer unit	68 00
SM6	Desk microphone	57 00
IC 490 A	Multi-mode mobile 10W 5 memories	
C-47A	FM mobile 25 watts, 9 memories	
IC-45A	FM mobile 10 watts 5 memories	
BU 1	Memory back up unit for mobiles	39 50
AG1	Masthead pre-amp for 471A/451/490	95 00
AG35	Masthead pre-amp for 471H	128 00
IC-4E	Synthesized hand held 1.5W	
IC-04A	Synthesized hand held K'pad entry LCD	

1.2 GHz EQUIPMENT

IC-120	FM transceiver 1 watt output	699 00
CA1200	Mobile antenna gutter mounted cable	126 00
ML12	10 watts booster with pre-amp	450 00
PS45	External power supply 8 amp	199 00

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The World System
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IC 009

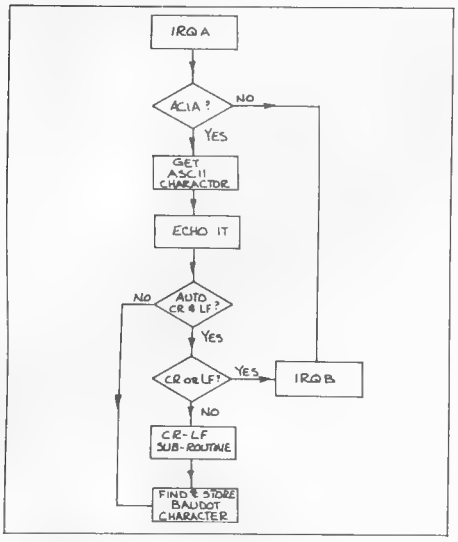
VK3BFG RTTY — MORSE

```
05330 E460 09           DEX
05340 E461 26 FB        BNE    L1
05350 E463 CE 0F01      LDX    #$0F01
05360 E466 DF 1B        STX    SPEEDA
05370 E468 86 40        LDA A  #64
05380 E46A 97 64        STA A  BUFTOP
05390 E46C CE E400      LDX    #CODE
05400 E46F DF 10        STX    CVCX

05410 E471 CE 0064      LDX    #BUFTOP
05420 E474 DF 12        STX    SAVEX
05430 E476 CF 8004      LDX    #PIAD
05440 E479 6F 01        CLR    1,X
05450 E47B 6F 03        CLR    3,X
05460 E47D 8E 0007      LDS    #$0007
05470 E480 AF 00        STS    0,X
05480 E482 8E FF34      LDS    #$FF34
05490 E485 AF 02        STS    2,X
05500 E487 A6 00        LDA A  0,X
05510 E489 A6 02        LDA A  2,X
05520 E48B 8E 007F      LDS    #SPOINT
05530 E48E C6 20        LDA B  #32      SET RECEIVE ****
05540 E490 D7 65        STA B  RXCHM
05550 E492 D7 07        STA B  RXCNT
05560 E494 CE E4A0      LDX    #MESS6
05570 E497 BD E0EA      JSR    OUTM
05580 E49A 01           NOP
05590 E49B 0E           CLI
05600 E49C 01           NOP
05610 E49D 3E       EXEC WAI
05620 E49E 20 FD        BRA    EXEC
05630               *
05640 E4A0 0D       MESS6 FCB  $0D,$0A,$0A
05650 E4A3 52           FCC    /READY/
05660 E4A8 0D           FCB    $0D,$0A,$0A
05670 E4AB 04           FCB    $04
05680               *
05690 E4AC 7D 0005  IRQM  TST  PIAC
05700 E4AF 2B 0E        BMI    POLL2
05710 E4B1 7D 8040      TST    ACIAS
05720 E4B4 2B 68        BMI    COMMR1
05730 E4B6 7B 0016      TST    BUFLAG
05740 E4B9 2B 03        BMI    NOTRCV
05750 E4BB 7E E5F7      JMP    REC
05760 E4BE 3B       NOTRCV RTI
05770               *
05780 E4BF F6 8004  POLL2 LDA B  PIAD
05790 E4C2 F6 8006      LDA B  PIBD
05800 E4C5 CA 04        ORA B  #4
05810 E4C7 F7 8006      STA B  PIBD
05820 E4CA 96 17        LDA A  COSTA
05830 E4CC 2A 07        BPL    CFDAH
05840 E4CE C6 7F        LDA B  #$7F
05850 E4D0 17 15        STA B  RESMSK
05860 E4D2 5F       CES1 CLR B
05870 E4D3 20 29        BRA    CKCNT
05880 E4D5 48       CFDAH ASL A
05890 E4D6 2A 08        BPL    CFES
05900 E4D8 C6 BF        LDA B  #$BF
05910 E4DA D7 15        STA B  RESMSK
05920 E4DC C6 04        LDA B  #4
05930 E4DE 20 1E        BRA    CKCNT
05940               *
05950 E4E0 48       CFES  ASL A
05960 E4E1 2A 0A        BPL    CFWS
05970 E4E3 C6 DF        LDA B  #$DF
05980 E4E5 D7 15        STA B  RESMSK
05990 E4E7 BD 2C        BSR    SOZERO
06000 E4E9 C6 01        LDA B  #1
06010 E4EB 20 11        BRA    CKCNT
06020 E4ED 48       CFWS  ASL A
06030 E4EE 2A 08        BPL    CFCS
06040 E4F0 C6 FF        LDA B  #$FF
06050 E4F2 D7 15        STA B  RESMSK
06060 E4F4 C6 08        LDA B  #8
06070 E4F6 20 06        BRA    CKCNT
06080               *
06090 E4F8 C6 F7    CFCS  LDA B  #$F7
06100 E4FA D7 15        STA B  RESMSK
06110 E4FC C6 04        LDA B  #4
06120 E4FE 11 14    CKCNT CMP B  COUNT
06130 E500 27 06        BEQ    CK1
06140 E502 7C 0014      INC    COUNT
06150 E505 7E E4AC  RETIN JMP  IRQM
06160               *
06170 E508 7F 0014  CK1   CLR  COUNT
06180 E50B 96 17        LDA A  COSTA
06190 E50D 94 15        AND A  RESMSK
06200 E50F 97 17        STA A  COSTA
06210 E511 26 F2        BNE    RETIN
06220 E513 20 14        BRA    GNEL
06230               *
06240 E515 F6 8006  SOZERO LDA B  PIBD
06250 E518 84 FF        AND A  #$FF
06260 E51A F7 8006      STA B  PIBD
06270 E51D 39           RTS
06280 E51E 20 64    COMMR1 BRA    COMMR
06290               *
```

```
06300 E520 B6 8006  SOUNE LDA A  PIBD
06310 E523 8A 01        ORA A  #1
06320 E525 B7 8006      STA A  PIBD
06330 E528 39           RTS
06340               *
06350 E529 96 64    ONE   LDA A  BUFTOP
06360 E52B 81 80        CMP A  #$80
06370 E52D 26 26        BNE    GNEL1
06380 E52F 86 06        LDA A  #6
06390 E531 97 17        STA A  COSTA
06400 E533 8D E0        BSR    SOZERO
06410 E535 DE 12        LDX    SAVEX
06420 E537 8C 0044      CPX    #BUFTOP
06430 E53A 26 09        BNE    GNELK
06440 E53C 96 16        LDA A  BUFLAG
06450 E53E 84 7F        AND A  #$7F
06460 E540 97 16        STA A  BUFLAG
06470 E542 7E E4AC      JMP    IRQM
06480               *
06490 E545 86 21    GNELK BSR    MOVUF
06500 E547 96 64        LDA A  BUFTOP
06510 E549 81 21        CMP A  #$21
06520 E54B 27 1A        BEQ    SWS
06530 E54D 7D 0017      TST    COSTA
06540 E550 27 03        BEQ    GNEL1
06550 E552 7E E4AC      JMP    IRQM
06560               *
06570 E555 78 0064  GNEL1 ASL    BUFTOP
06580 E558 25 04        BCS    SOUAH
06590 E55A 86 A0        LDA A  #$A0
06600 E55C 20 02        BRA    SOE1
06610               *
06620 E55E 86 60    SOUAH LDA A  #$60
06630 E560 97 17    SOE1  STA A  COSTA
06640 E562 8D E5        BSR    SOUNE
06650 E564 7E E4AC      JMP    IRQM
06660 E567 86 80    SWS   LDA A  #$80
06670 E569 97 64        STA A  BUFTOP
06680 E56B 86 10        LDA A  #$10
06690 E56D 97 17        STA A  COSTA
06700 E56F 8D A4        BSR    SOZERO
06710 E571 7E E4AC      JMP    IRQM
06720               *
06730 E574 CE 0040  MOVUF LDX    #BUFTOP-$BUFBOT
06740 E577 A6 23    MOV1  LDA A  BUFBOT,X
06750 E579 A7 00        STA A  BUFBOT,X
06760 E57B 09           DEX
06770 E57C 26 F9        BNE    MOV1
06780 E57E DF 12        LDX    SAVEX
06790 E580 08           INX
06800 E581 DF 12        STX    SAVEX
06810 E583 39       MOVRT RTS
06820               *
06830 E584 DE 12    COMMR LDX    SAVEX
06840 E586 E6 8041      LDA B  ACIAD
06850 E589 84 7F        AND A  #$7F
06860 E58B 81 01        CMP A  #$01
06870 E58D 27 24        BEQ    GOUTC
06880 E58F 81 0A        CMP A  #$0A
06890 E591 27 23        BEQ    GOUTC
06900 E593 8C 0024      CPX    #BUFBOT
06910 E596 22 4E        BHI    BUFFUL
06920 E598 81 0A        CMP A  #$0A
06930 E59A 22 53        BHI    BAICH
06940 E59C 97 11        STA A  CVCX+1
06950 E59E DE 10        LDX    CVCX
06960 E5A0 E6 00        LDA B  0,X
06970 E5A2 27 4B        BEQ    BAICH
06980 E5A4 DE 12        LDX    SAVEX
06990 E5A6 09           DEX
07000 E5A7 E7 00        STA B  0,X
07010 E5A9 DF 12        STX    SAVEX
07020 E5AB D6 16        LDA B  BUFLAG
07030 E5AD CA 80        ORA B  #$80
07040 E5AF D7 16        STA B  BUFLAG
07050 E5B1 BD 0C        BSR    OUTC
07060 E5B3 7E E4AC  ENDCM JMP  IRQM
07070               *
07080 E5B6 BD E0BF  GOUTC JSR    OUTCH
07090 E5B9 D6 65        LDA B  RXCHM
07100 E5BB D7 07        STA B  RXCNT
07110 E5BD 20 F4        BRA    ENDCM
07120               *
07130 E5BF BD E0BF  OUTC  JSR    OUTCH
07140 E5C2 7A 0007      DEC    RXCNT
07150 E5C5 27 08        BEQ    GOUCR
07160 E5C7 16 07        LDA B  RXCNT
07170 E5C9 C1 06        CMP B  #6
07180 E5CB 23 11        BLS    IRQS
07190 E5CD 20 0F        BRA    GOUT
07200 E5CF 86 0D    GOCR  LDA A  #$0D
07210 E5D1 BD E0BF      JSR    OUTCH
07220 E5D4 86 0A        LDA A  #$0A
07230 E5D6 BD E0BF      JSR    OUTCH
07240 E5D9 D6 65        LDA B  RXCHM
07250 E5DB D7 07        STA B  RXCNT
07260 E5DD 39       GOUT  RTS
```

Programme continued p24



Transmit Sequence IRQA Request — RTTY Mode.

ADJUSTMENT OF CLOCKS

As described the RTTYMORSE is self booting and is controlled by subsequent keyboard entries. The only set-up adjustment needed is the 555 clocks.

Using a frequency counter on pin 3 of each respective 555, adjust the ten turn potentiometer as follows —
45.5 Baud — 728 Hz
50 Baud — 800 Hz
110 Baud — 1760 Hz
300 Baud — 4800 Hz
in all cases sixteen times the required Baud rate.

Well, that's about it. I would be happy to answer any queries that you may have but unfortunately I cannot supply printed circuit boards for the project.

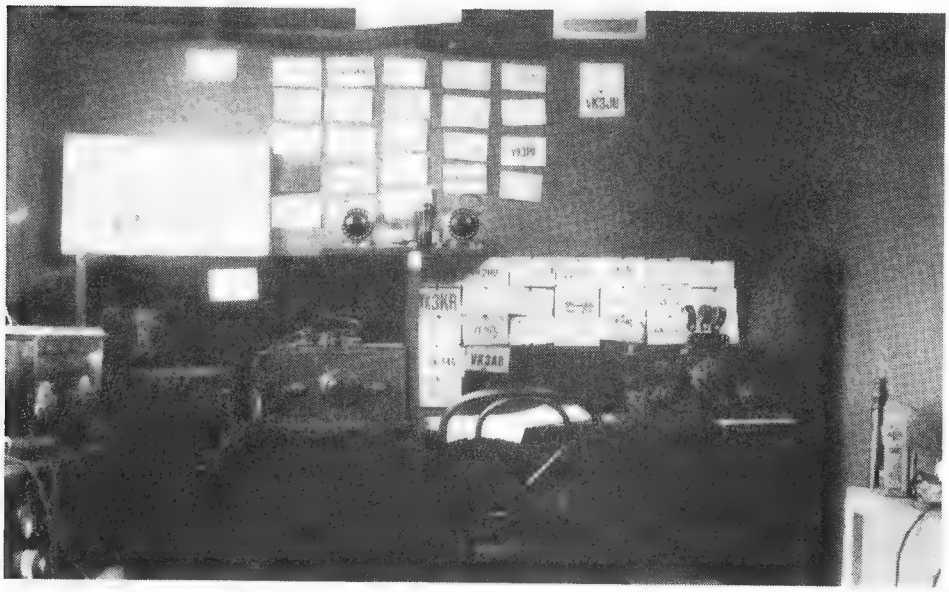
73 DE VK3BFG SK SK

AR

1 Editor's Note
These include address/data and control lines as well as the microprocessor and ROM. They are shown in Fig 1 but not on the schematic

Schematic Diagram on page 25. Full size printed circuit board layout on page 26.

THUMBNAIL SKETCHES



STAN TONKIN VK5SG ex VK2SG

Stan's licence was issued in June 1929. He held the call sign VK2SG from 1929-1955 when he became VK5SG — a call he still holds today.

His working life was completely involved in radio —1931 at 2AY, Albury, 1933 International Radio Company in Sydney, 1934 2UW Sydney, 1936 2LM Lismore, 1941-48 was spent working for AWA in different positions and from 1955 to retirement in 1975 Stan was at EMI Electronics in SA.

The equipment at Stans station in 1930 consisted of L to R: Power supply, Hartley Oscillator (25W) and modulator, ATU, wet receiver HT battery, receiver regen detector, TPTG oscillator — Ross Hull QST version, long wave receiver detector and an audio amplifier.

Stan is still operational today using an FT290R and an FT101Z.

AR

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VK3BFG RTTY — MORSE

```
07270 E5DE 81 20    TESC   CMP A  #$20
07280 E5E0 27 ED           BEQ    GOCK
07290 E5E2 20 F9           BRA    GOUT
07300 E5E4 20 9E    COMMR2 BRA    COMMR
07310               *
07320 E5E6 CE E45A  BUFFUL LDX    #MESS5
07330 E5E9 BD E00A         JSR    OUTN
07340 E5EC 7E E4AC         JMP    IRQM.
07350               *
07360 E5EF 86 23    BADCH  LDA A  #$23
07370 E5F1 BD E5BF         JSR    OUTC
07380 E5F4 7E E4AC         JMP    IRQM
07390               *
07400 E5F7 B6 8006  REC    LDA A  PIAD
07410 E5FA 84 FB           AND A  #$FB
07420 E5FC B7 8006         STA A  PIAD
07430 E5FF 86 FF    KEYUP  LDA A  #$FF
07440 E601 81 FE    KULOOP CMP A  #$FE
07450 E603 27 03           BEQ    NOINC
07460 E605 4C              INC A
07470 E606 20 0A           BRA    KUCONT
07480               *
07490 E608 97 21    NOINC  STA A  KUTIM
07500 E60A D6 1C           LDA B  RCHAR
07510 E60C C1 01           CMP B  #1
07520 E60E 27 02           BEQ    KUCONT
07530 E610 8D 4C           BSR    COMPKU
07540 E612 F6 8004  KUCONT LDA B  PIAD
07550 E615 2B 09           BMI    KD
07560 E617 8D 36           BSR    TIMER
07570               *
07580 E619 7D 8040         TST    ACIAS
07590 E61C 2B C6           BMI    COMMR2
07600 E61E 20 E1           BRA    KULOOP
07610 E620 97 21    KD     STA A  KUTIM
07620 E622 8D 3A           BSR    COMPKU
07630 E624 86 FF    KEYDWN LDA A  #$FF
07640 E626 81 FF    KDLOOP CMP A  #$FF
07650 E628 27 01           BEQ    MAXKD
07660 E62A 4C              INC A
07670 E62B F6 8004  MAXKD  LDA B  PIAD
07680 E62E 2A 04           BPL    KU
07690 E630 8D 1D           BSR    TIMER
07700 E632 20 F2           BRA    KDLOOP
07710               *
07720 E634 97 20    KU     STA A  KUTIM
07730 E636 81 04           CMP A  #4
07740 E638 24 05           BCC    CKHI
07750 E63A 96 1E           LDA A  SPEEDK
07760 E63C 44              LSR A
07770 E63D 20 07           BRA    UNZERO
07780               *
07790 E63F 81 7F    CKHI   CMP A  #$7F
07800 E641 25 07           BCS    CMPTKD
07810 E643 96 1E           LDA A  SPEEDK
07820 E645 48              ASL A
07830 E646 8A 01    UNZERO ORA A  #1
07840 E648 97 1E           STA A  SPEEDK
07850 E64A 8D 31    CMPTKD BSR    COMPKD
07860 E64C 7E E5FF         JMP    KEYUP
07870               *
07880 E64F 37       TIMER  PSH B
07890 E650 36              PSH A
07900 E651 D6 1E           LDA B  SPEEDK
07910 E653 86 40    DELOP2 LDA A  #$40
07920 E655 4A       DELOOP DEC A
07930 E656 26 FD           BNE    DELOOP
07940 E658 5A              DEC B
07950 E659 26 F7           BNE    DELOP2
07960 E65B 32              PUL A
07970 E65C 33              PUL B
07980 E65D 39              RTS
07990               *
```

```
08000 E65E 91 1E    COMPKU CMP A  TRLDAT
08010 E660 25 1A           BCS    MOREL
08020 E662 96 1C           LDA A  RCHAR
08030 E664 81 01           CMP A  #1
08040 E666 27 09           BEQ    CKFSP
08050 E668 8D 4A           BSR    GAFT
08060 E66A BD E5BF         JSR    OUTC
08070 E66D 86 01           LDA A  #1
08080 E66F 97 1C           STA A  RCHAR
08090 E671 96 1F    CKFSP  LDA A  TLDAT
08100 E673 91 21           CMP A  KUTIM
08110 E675 24 05           BCC    MOREL
08120 E677 86 20           LDA A  #$20
08130 E679 BD E5BF         JSR    OUTC
08140 E67C 39       MOREL  RTS
08150               *
08160 E67D 96 1A    COMPKD LDA A  TLETIM
08170 E67F 91 20           CMP A  KDTIM
08180 E681 25 10           BCS    DASHEL
08190 E683 96 19           LDA A  HLETIM
08200 E685 91 20           CMP A  KDTIM
08210 E687 24 04           BCC    DOTEL
08220 E689 96 18           LDA A  LETYPE
08230 E68B 26 06           BNE    DASHEL
08240 E68D 7E 0018  DOTEL  JMP    DOT
08250 E690 0C              CLC
08260 E691 20 14           BRA    ADDEL
08270 E693 7C 0018  DASHEL INC    LETYPE
08280 E696 96 20           LDA A  KDTIM
08290 E698 97 1F           STA A  LDATIM
08300 E69A 16              TAB
08310 E69B 44              LSR A
08320 E69C 97 1E           STA A  TRLDAT
08330 E69E 44              LSR A
08340 E69F 9B 1E           ADD A  TRLDAT
08350 E6A1 97 1E           STA A  TRLDAT
08360 E6A3 58              ASL B
08370 E6A4 D7 1F           STA B  TLDAT
08380 E6A6 0D              SEC
08390 E6A7 79 001C  ADDEL  ROL    RCHAR
08400 E6AA 96 20           LDA A  KDTIM
08410 E6AC 16              TAB
08420 E6AD 44              LSR A
08430 E6AE 97 19           STA A  HLETIM
08440 E6B0 58              ASL B
08450 E6B1 D7 1A           STA B  TLETIM
08460 E6B3 39              RTS
08470               *
08480 E6B4 0D       GAFT   SEC
08490 E6B5 49              ROL A
08500 E6B6 48       GAFT1  ASL A
08510 E6B7 24 FD           BCC    GAFT1
08520 E6B9 CE E45A         LDX    #GOM 1
08530 E6BC A1 00    STABI  CMP A  0,X
08540 E6BE 27 09           BEQ    TABM
08550 E6C0 09              DEX
08560 E6C1 8C E421         CPX    #RTAB+1
08570 E6C4 26 F6           BNE    STABI
08580 E6C6 86 5F           LDA A  #$5F
08590 E6C8 39              RTS
08600               *
08610 E6C9 DF 23    TABM   STX    RELX
08620 E6CB 96 24           LDA A  RECXHI
08630 E6CD 39              RTS
08640               *
08650 E7F8                 ORG    $E7F8
08660               *
08670 E7F8 E1DA            FDB    IRQA
08680 E7FA F000            FDB    INIT
08690 E7FC F000            FDB    INIT
08700 E7FE F000            FDB    INIT
08710               *
08720                      END
```


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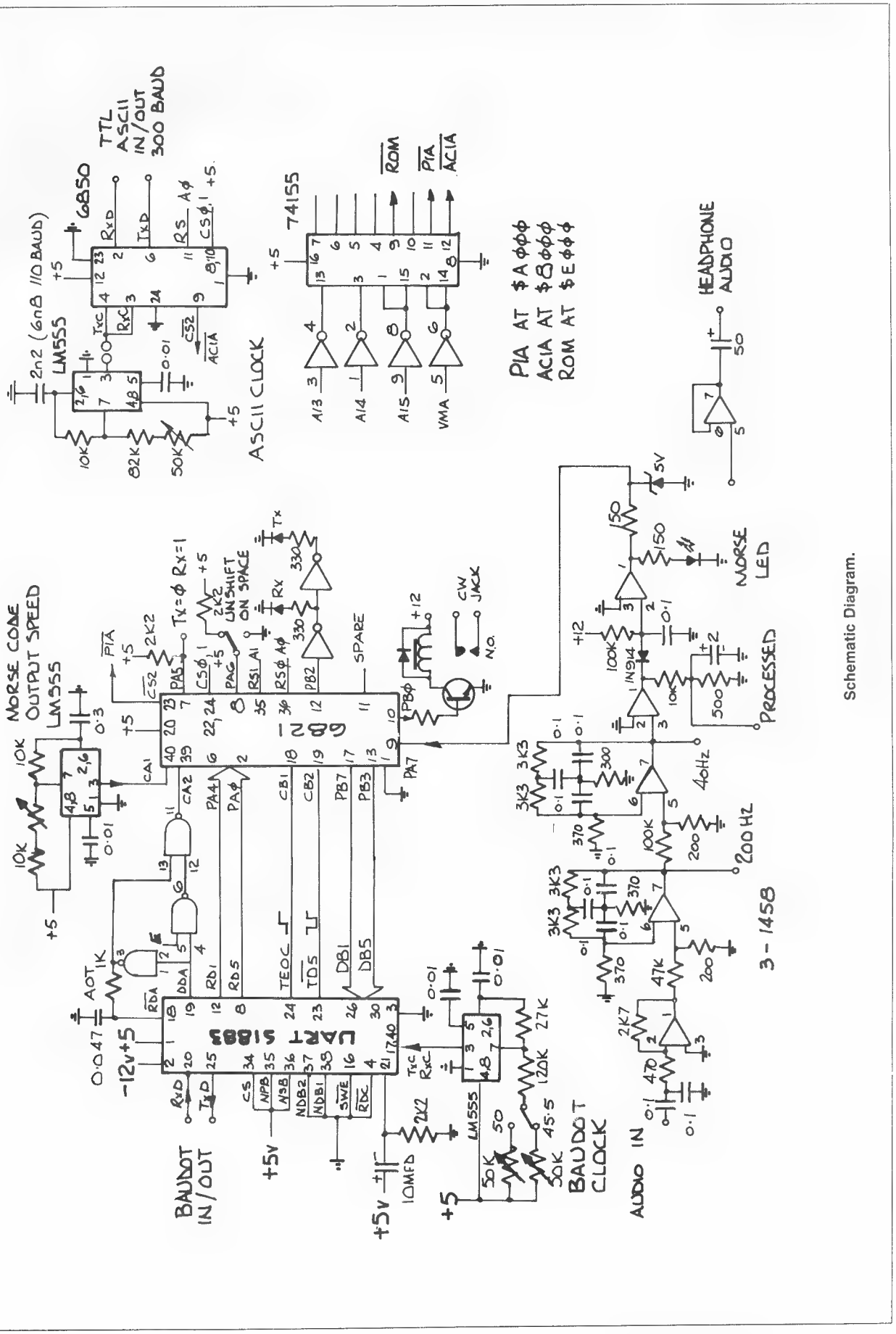
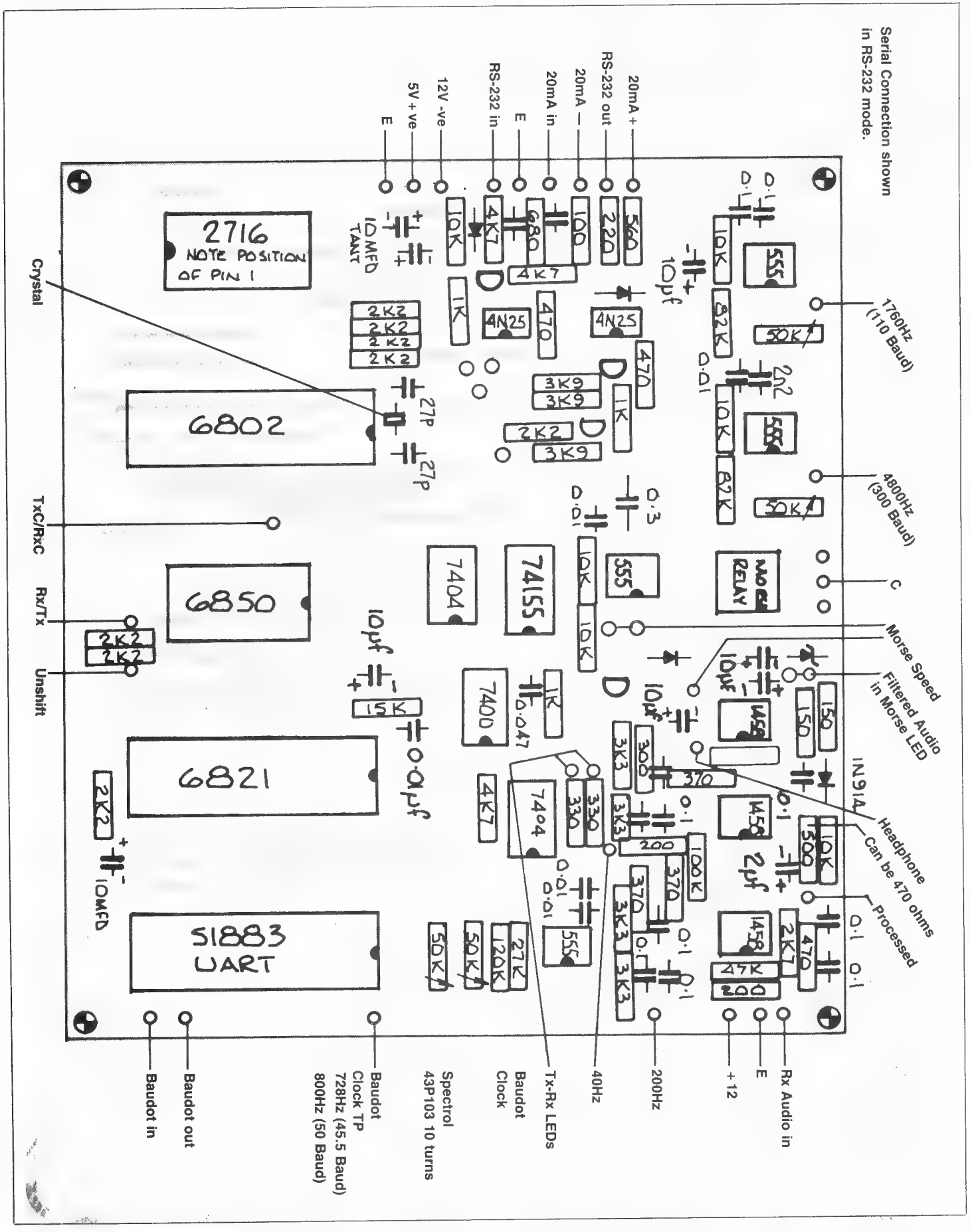


Schematic Diagram.


Serial Connection shown in RS-232 mode.
2716 NOTE POSITION OF PIN 1
6802
6850
6821
S1883 UART
Crystal
TxC/RxC
Rx/Tx
Unshift
20mA +
RS-232 out
20mA —
20mA in
E
RS-232 in
12V -ve
5V + ve
E
10 MFD TANT
1760Hz (110 Baud)
4800Hz (300 Baud)
C
Morse Speed
Filtered Audio in Morse LED
IN914
Headphone
Can be 470 ohms
Processed
Rx Audio in
E
+ 12
200Hz
40Hz
Tx-Rx LEDs
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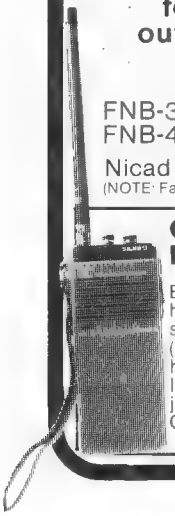
(NOTE: Fast charger available shortly – or roll your own! 2.5mm socket fitted to NiCad pack)



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VICTORIA'S 150TH ANNIVERSARY CONTEST

Chris Dimitrijevic VK3FY,
SECRETARY,
South Pacific Contest Club,
21 Belmont Avenue, Keilor Downs, Vic. 3038.

A unique contest, as part of amateur radio's involvement in the 150th anniversary of European settlement in Victoria, will be held this month. It's the first Australian contest to use the Maidenhead Locator System — a system fully explained later in this article.

The contest has been registered on the Victoria 150th Anniversary Committee official calendar of events and is being conducted by the South Pacific Contest Club VK3EZ — a member club of the WIA, Victorian Division.

RULES

1 Contest period: 24 hours from 0100UTC 26 January, to 0100UTC 27 January.
2 Bands: Australian novice segments of 80, 15, and 10 metres. All of 6 and 2 metres.
3 Mode: All modes permitted within individual amateur station licence conditions.
4 Classifications:
Novice
Limited
Single (fullcall, combined)
Multi-Operator/Single Transmitter
Multi-Operator/Multi-Transmitter
Shortwave Listener
5 Exchange: RS(T) plus Maidenhead Grid Location.
6 Restrictions:
a) No cross mode permitted.
b) No cross band allowed, exception satellite contacts.
c) Except Multi-Multi, transmitting more than one signal at the same time including cases of different bands is not permitted.
d) Points and Multipliers: Points: A required exchange with another Australian station will score one point. Multipliers: The number of different Australian grid locations worked on each band.
7 Scoring: The sum of contact points on each band, multiplied by the sum of multipliers on each band.
8 Summary and Log Sheets:
a) All times in UTC.
b) Indicate clearly all new multipliers worked on each band.
c) Use separate log sheets for each band.
d) A photograph of you operating during the contest, as well as your comments about the contest would be appreciated, but are not compulsory.
9 Awards:
a) High scores in each classification will receive a trophy.
b) Special award for the most exotic activated grid location.
10 Reporting:
a) Submit a summary and logs for one classification only.
b) Both log and summary must be postmarked no later than 27 February, 1985.
c) Send logs to: *South Pacific Contest Club, Contest Manager, 18 Jones Street, Thornbury, Vic. 3071.*
11 Disqualification:
a) Violation of contest rules.
b) False statement of report.
c) Taking points from duplicate contacts on the same band in excess of two percent of the total.
12 Announcement of Results: This will be done in November 1985, to coincide with the conclusion of Victoria 150 celebrations. Each entrant must abide by the decisions of the contest committee, which is final.

MAIDENHEAD LOCATORS FOR AUSTRALIA

The locator system is in use overseas and can be applied to field days, contests and awards.

Basically the system is based on breaking the world up into 324 major locators, these are of 20 degrees longitude and 10 degrees latitude with each being represented by two letters.

Within each major locator are 100 sub-locators, each numbered from 00-99. The sub-locators are of two degrees longitude and one degree latitude in size.

To give a clearer understanding of this concept a map of Australia is shown with all its major locators marked, and one major locator with its sub-locators.

Determining a Maidenhead Locator can be done in two easy steps. First find out the co-ordinates of your QTH, they should be available through the local municipal council. Then refer to the Maidenhead Co-ordinates Tables shown — and you're ready for the Victoria's 150th Anniversary Contest.

As an exercise let's pick some co-ordinates — longitude 137 degrees 56 minutes and latitude 26 degrees 37 minutes.

REFER TO THE CO-ORDINATES TABLES:

First part of locator: The main longitude location we find 137 lies between 120 degrees and 139 degrees 59 minutes, 59 seconds. First character is therefore P.

Second part of locator: The latitude in whole degrees is read. We find 26 degrees lies between 20 degrees and 29 degrees 59 minutes 59 seconds. Second character is G. Now we have the main locator of PG.

Third part of locator: The longitude is taken again, only the whole degree is required, giving the number 8.

Fourth part of locator: The latitude is now used, but this time only the second whole digit is used. In our example this is 6, which gives us the fourth part of the locator 3. Result: Mainhead Locator PG83. **AR**

TABLE NO 1

DEGREES LONGITUDE	1st CHARACTOR
100° - 119° 59' 59"	O
120° - 139° " "	P
140° - 159° " "	Q
160° - 179° " "	R

TABLE NO 2

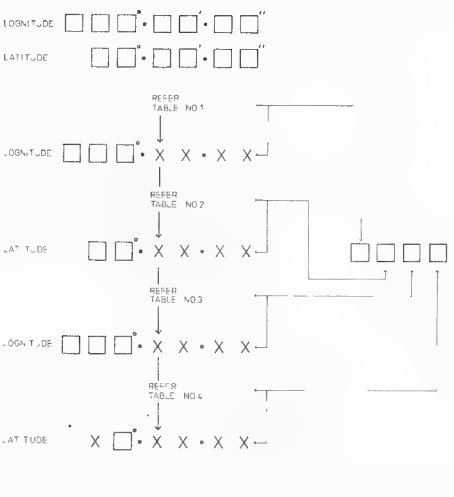
DEGREES AT TUDE	2nd CHARACTOR
0° 0'59 59"	I
10° - 19° "	H
20° 29° "	G
30° - 39° "	F
40° - 49° "	E

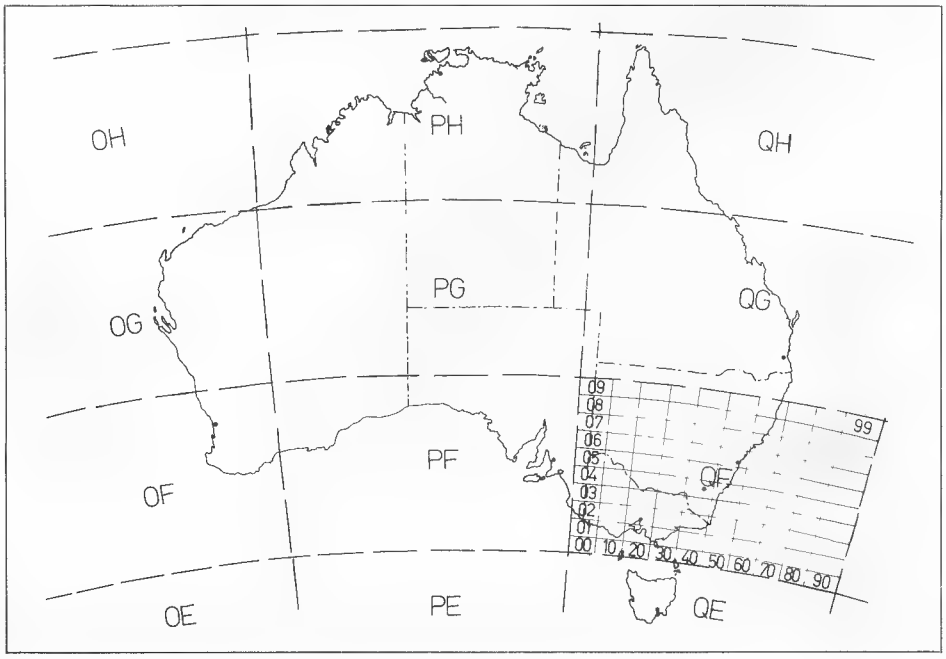
TABLE NO 4

2nd single digit of LATITUDE	4th CHARACTOR
0	9
1	8
2	7
3	6
4	5
5	4
6	3
7	2
8	1
9	0

TABLE NO 3

DEGREES LONGITUDE	3rd CHARACTOR
110° - 111°	5
112° - 113°	6
114° - 115°	7
116° - 117°	8
118° - 119°	9
120° - 121°	0
122° - 123°	1
124° - 125°	2
126° - 127°	3
128° - 129°	4
130° - 131°	5
132° - 133°	6
134° - 135°	7
136° - 137°	8
138° - 139°	9
140° - 141°	0
142° - 143°	1
144° - 145°	2
146° - 147°	3
148° - 149°	4
150° - 151°	5
152° - 153°	6
154° - 155°	7
156° - 157°	8
158° - 159°	9
160° - 161°	0





HAMVENTION 1984

Ken McLachlan VK3AH
PO Box 39, Mooroolbark, Vic, 3138

Ballarat "Hamvention" 1984, held on the 10th and 11th of November was a success, a success which will stay in the minds of all those who attended for a long time to come.

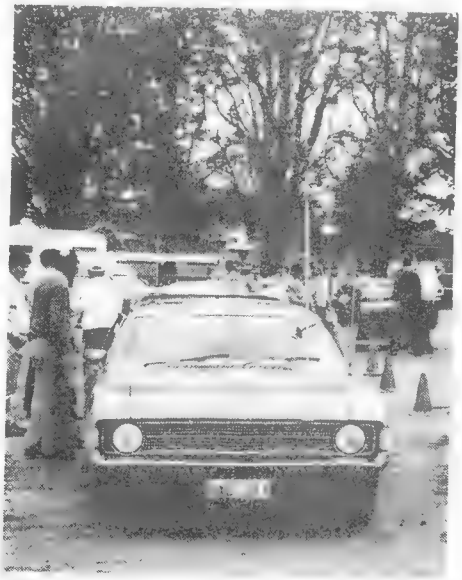
Enroute to the venue the road was distinctly marked and backed up by directions on the local repeater and a nominated frequency on 80 metres. On arrival, ample and safe parking was available with explicit directions indicating where to find the registration desk, commercial displays and refreshments. From being greeted with a sincere welcome, organisation was spot on from registration to the end of the week-end.

Over pre-dinner drinks many old friendships and new acquaintances were made. After the serving of a sumptuous meal to the tunes from a talented organist, the 90 odd guests were treated to a very lively and humourous talk by a local barrister with many years experience representing the locals in times of trouble. Laughter at times drowned out the heavy thunder-storm overhead.

Paul VK3BW'C — organist.

Dancing and reminiscing carried on to the hours that some would like to forget, considering that in a few hours many events like scrambles, sniffer and fox hunts were to be decided.

Stan VK3BSR, proprietor of Bail Electronics, chats to Bill VK3PAL, whilst Bert VK3BH looks at the equipment.



Preparing for one of the Fox Hunts. This VK5 vehicle, and occupants, was a winner.

The many trade displays were stocked with the latest equipment, brochures and were beseiged by interested customers regarding state of the art developments and trends the hobby is taking.

There was always something to do. The barbecue lunch was excellent and prior to the presentations and trip home the estimated gathering of 250 were treated to a very filling afternoon tea.

Greg VK5ZGY and Geoff VK3ADB enjoy a quiet natter. Geoff is the President of the Ballarat ARC.

Tom VK5EE, David VK5FF and Greg VK5ZGY check out a trade exhibit.

The general opinion of many of the visitors I chatted with was that it was one of the best they had visited anywhere and, in my book, it had a five star rating.

Maurie VK3XEX checks over his home brew power supply prior to judging.

Many of the prizes went to the Mount Gambier group and a friendly challenge was issued to attend their attraction next year and win them back. The "Home Brew" competition was won by Maurie VK3XEX with work that could be attributed to a perfectionist.

Brian VK3KQB.

The committee must be applauded for the success of the social-hobby get together but they cannot accept all the accolades. The small, but extremely effective, newly formed Ladies Auxiliary are to be congratulated in supporting their partners hobby and making the event such a success.

Congratulations to all and I, like others, are already looking forward to next year's "Hamvention".

AR

HOW'S DX

Ken McLachlan, VK3AH
Box 39, Mooroolbark, Vic 3138

The prelude to start this column has been kindly written by Ivor VK3XB. Ivor and his XYL Mavis VK3KS are known world wide for their amateur activities particularly in the CW sections of the bands.

I had the pleasure of interviewing this charming couple recently on Feedback, an amateur radio orientated programme broadcast fortnightly on 3RPH, "Radio for the Print Handicapped" and it was only then that I found out some of the accomplishments of this happy duo.

Ivor licenced in 1934, has attained many honours from the hobby including being the winner of many world wide contests, the first winner of the Australian Contest Trophy (and a few thereafter) and being made a Life Member of the WIA, to name but a few.

Ivor in his profession with the Education Department attained the position of Principal before his retirement. He has always had and made time to put something back into the hobby he so much enjoys. He had the onerous task of being Outwards QSL Manager for some fourteen years and has taken an extreme interest in Intruder Watching, a facet of the hobby that is so important but often overlooked or taken for granted.

DXING OVER THE YEARS

Long distance communication has been the aim of amateur radio right from the very beginning. We can go back to the Trans-Atlantic tests of 1903. Marconi considered himself "only an amateur", and with him we must group Godley and many others. Their aim was DX though they did not call it such. Their enthusiasm fired the imagination of thousands of would be experimenters, and amateur radio was born.

On 110 metres in 1923, American amateurs achieved their first exciting DX. In Australia, our first real DXer was Max Howden VK3BQ, whose exploits have already been most capably handled by Max Hull VK3ZS in his story appearing in a recent issue of "Amateur Radio".

Comparatively isolated though Australia was, her amateurs, favored by a very friendly administration, soon established themselves as an internationally recognised body. As has often been mentioned by reminiscing amateurs, transmitting and receiving equipment in the twenties and thirties was practically all home built, most amateurs running less than 25 watts input which was the legal limit. As for receivers, the ownership of a Hammarlund or a Hallicrafters receiver was so unique that all Australia knew about the affluent possessor.

I started on .6 of a watt, but by 1936 had 7 watts to a pair of Type 19 two volt battery tubes, and was working DX regularly using a 7 wavelength aside vee beam. Other country amateurs also had huge vee beams or rhombics but metropolitan amateurs were restricted to end or centre fed Zepps or a single wire fed Hertz, until, a few years later, the Yagi surfaced and revolutionized DXing from the city. All manner of wire beams appeared.

In the thirties, CW operation predominated, but phone operators invariably answered anyone calling them on CW. What a contrast today! Crystal control was regarded as the ultimate in efficiency, but the TPTG was very popular. Calls on CW were longer and made in a more leisurely fashion. Answering on the other station's frequency occurred more by accident than plan. A South American calling "CQ DX" would have a number of stations responding anywhere in the band. By those suitably equipped, "Now try phone here" was the logical follow on from receiving a 579 report on CW.

The ARRL Worked All Continents Certificate was the goal of nearly every amateur. Though requiring only six contacts, the difficulty in gaining a South American contact in those times was such that the phrase, "Hooray, WAC at last" often hit the ether. After WAC came a further and often seemingly unattainable goal, the ARRL DXCC. Aids to gaining this were participation in the BERU Contest, begun in 1931, and later, thanks to Bob Cunningham VK3ML, the Centenary DX Contest and the VK/ZL Contest that followed. In Victoria, the Bureau, managed by Ray Jones VK3RJ, was almost exclusively the route for QSL card exchange.

While 10 metres already had its devotees, Clarry Castle VK5KL, being the first VK to gain WAC on that band, 20 metres was then, as now, the chief DX band. The presence of an "American Phone Band" determined where everyone else would be. In the thirties, this tract of howling heterodynes was located in the middle of the band. Hence the rest of the world was forced to sit on either side, the CW operators gathering on the high frequency end and the AM phone operators on the low frequency end, those of the latter who desired to contact American phones tending to cluster close to the phone boundary and tune inside for replies. But, after the war ended, amateurs world wide discovered the "American Phone Band" now on the high frequency half with the first SSB stations venturing in near the edge, and gradually creeping down. So the world's CW operators were now on the low frequency end. The much vaunted crystal controlled rigs gradually disappeared as Clapp VFOs came in. Now, calling the DX station on his or her own frequency saw the advent of a new phenomenon, the dogpile. And a valuable by-product of wartime communications development, the propagation chart now told us when to expect the DX. In Australia, commercially made equipment appeared; the Geloso and Eddystone gear comes readily to mind. A new incentive to DX chasing was provided when, in May 1948, the WIA instituted its own DXCC, and Bill Mitchell VK3UM, secretary of the Federal Awards Committee signified that Ron Tandy VK3KX would receive Certificate Number 1.

Through this period, our legal power was gradually being raised, and true transmitting valves became common in all transmitters. By 1950, SSB operation was well established. The six feet high and one and a half feet wide rack and panel rigs were disappearing. With the commercially produced compact transmitters rendering portable operation easier, the era of the DXpedition began, two of the first exponents being Dick McKercher and Danny Weil, followed by Gus Browning and Don Miller and many others. Competition for the exotic contacts became fierce and the standard of operating rose tremendously. After the dogpiles came the "tail ending techniques" and then the "QSX up" procedure. With QSL managers proliferating, and the race for DX credits almost frantic, the use of IRCs, CRCs and "green stamps" became established procedure for quicker return of cards.

For phone stations, the next innovation was "List working" with a "Master of Ceremonies", and this was followed by DX Nets, all of which were a boon to the less affluent amateur with modest equipment. Such are now well established. While some net controls meticulously observe dignity and correctness coupled with speed, others in their enthusiasm hand out too much information so that the wanted DX station knows practically everything before the person on the list has even made a transmission. In the case of some overseas controls, (but not Australian I am glad to note), the prompting and leading makes contacts rather too easy.

To sum up. Prewar, all operators gained their DX contacts on their comparatively simple gear by patience and perseverence alone. Postwar, with the tremendous rise in the amateur population and the ready availability of commercial equipment embodying striking scientific advances, accommodation pressures have given rise to the need for the techniques and aids already mentioned. But the CW operators still retain a nostalgic link with the past and continue to display a facet of the old amateur radio, gaining thereby the satisfaction of doing it by themselves.

I sincerely thank you Ivor, on behalf of all the readers, for a very interesting contribution to commence this column in 1985, the 75th Anniversary of our Society, and trust that during the forthcoming years you and your XYL Mavis will still continue to enjoy the hobby you both love so much.

NAME CHANGE

The country of Upper Volta, with the prefix of XT, has changed its name to Bourkina Fasso. The native translation of this unusual name means "Land of the Upright Men". Many DXers would like to see more upright operational antennas with signals eminating from them.

BHUTAN

Pradhan A51PN, is definitely not active, and it appears his call may have been pirated from time to time from reports received. Meanwhile A5 is climbing the much wanted ladder caused by newcomers that are either newly licenced or have caught the DX bug.

Pradhan, is a radio engineer by profession, employed by the government in the communications field. His main responsibility lies in the maintenance of some of the forty odd broadcast stations that are scattered around the undulating land east of the Himalayan mountains. At best there is little time for the hobby.

A recent business visit by Seiji JH1WXH to Bhutan allowed some operating with oral permission but no written documentation was available as foreign amateurs are not allowed to hold an A5 licence under the present operating regulations. This may change within the next few years.

Seiji, left a new FT-757GX in Thimbu for Pradhan. The question is now whether Pradhan, when in the capital, will make time to try the new rig out.

THE GLOBETROTTING COLVIN'S

Lloyd and Iris, the couple that have made nearly a million QSO's to their credit and received close to half a million alphabetically indexed cards which weigh over 5000 kilogrammes have jaunted over to the south of Africa until late March. They hope to activate a number of the unusual countries in that area but nothing is guaranteed.

SAN FELIX ISLAND

The operators returned safe and well, with the logs. The Club's aim was to commence posting QSL cards from the first week of last month. Perhaps many DXers have received their Christmas surprise already!

BANGLADESH

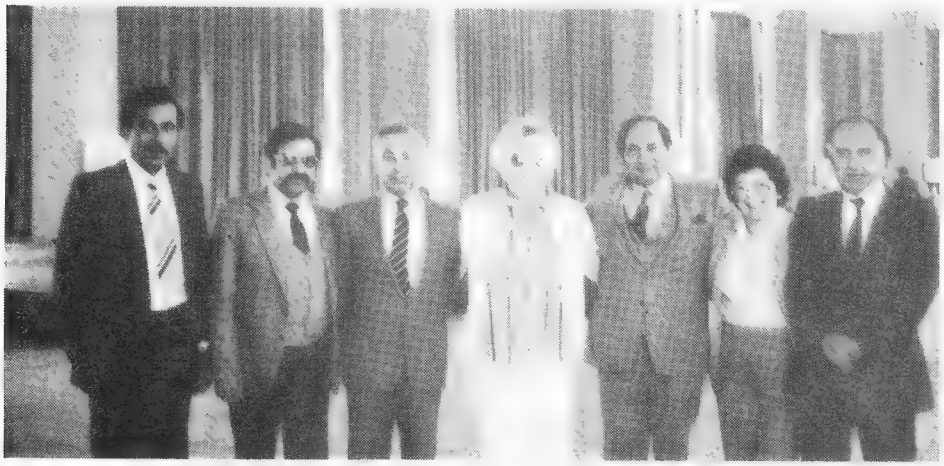
At present there are a number of JA amateurs working on radio communications in the country. The licences of S21JA, DX and FT have been issued for "testing" purposes and are not to be used for any DX working. This is strange as reports over the last

couple of years indicated that the licensing authority was relaxing some of their rigid conditions.

It is believed that negotiations to the authorities, in conjunction with the Bangladesh Amateur Radio League are still continuing for the allowance of nationals and foreigners to obtain full operating privileges.

CAUGHT BY THE CAMERA

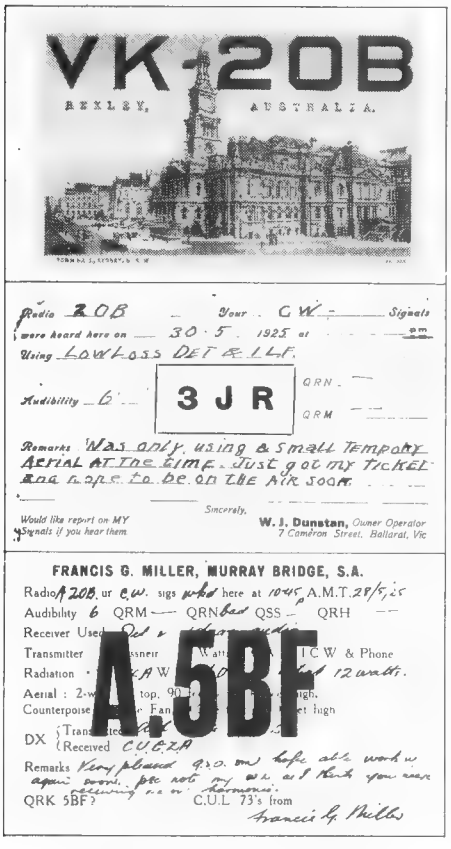
Photographs of Jordanian amateurs are hard to come by but this happy picture was taken when Mary Ann WA3HUP/JY9AA and Ruthanna WB3CQN/JY4CQ, both WIA members visited Amman early last year.



From L to R Ibrahim JY4MB, Mohammed JY5ZM, Dr Zuheir JY5ZM, Ruthanna, His Royal Highness Prince Raad JY2RZ (Chairman of the Royal Jordanian Amateur Society), Mary Ann and Zedan JY3ZH (Conroller of the Arabian Knights Net).

CARDS OF YESTERYEAR

Again, some more cards of yesteryear which belonged to the late Lionel Mashmen VK2OB and have been kindly forwarded by Arthur VK2JM. All cards are from the 1925 era.


VK-2OB
BEXLEY, AUSTRALIA.
Radio 2OB Your C.W. Signals
were heard here on 30.5. 1925 at pm
Using Low loss DET & L.F.
Audibility 6
3 J R
QRN
QRM
Remarks Was only using a small Tempory Aerial at the time. Just got my ticket and hope to be on the Air soon.
Sincerely,
W. J. Dunstan, Owner Operator
7 Cameron Street, Ballarat, Vic
Would like report on MY Signals if you hear them
FRANCIS G. MILLER, MURRAY BRIDGE, S.A.
Radio 2OB ur C.W. sigs wkd here at 1045 A.M.T. 28/5/25
Audibility 6 QRM QRN bad QSS QRH
Receiver Used
Transmitter
Radiation
Aerial :
Counterpoise
DX
Remarks Very pleased g.s.o. and hope able work u again soon. pse note my w.l. as I think you were receiving me on Harmonic.
QRK 5BF? C.U.L. 73's from
Francis G. Miller
A.5BF

SOMALIA

It is believed that Marti OH2BH, has his credentials signed by the president for an operation to commence from T5 in the near future. Any operation from this area causes extreme interest and with Marti operating and at the helm re QSLing it would be a must.

BEEN THERE — DONE THAT!

Sao Tome, a much wanted country was activated. Those that were waiting for Craig WB7RFA to sign S9 were confronted by a whistle stop of a few hours by PS7ABT/S9 who worked some European, JA and North American stations (which you could count on one hand).

At the time of writing, no further information is avialable on Craig's whereabouts who is visiting the country on a contract to design new postage stamps for the authorities. All I require is good propagation and one minute of the time of a genuine operator in this much wanted country. What a start to the new year that would be!

KEEP AN EAR OUT FOR —

Over the New Year break it would pay to keep an eye out for Pradhan A51PN with his new rig, AX0PB operational in the Antarctic, VP8ASO on a quick trip to South Sandwich territory which may pre-empt a longer stay, Dr Sid ST2SA mobile on his "house" calls and anything that sounds like 3Y.

9L1CISV

This unusual call sign is from a special events station at the Childrens International Summer Village Camp in Freetown and is sponsored by the Sierra Leone Amateur Radio Society. QSL to Cassandra 9L1YL.

TWO AMATEURS IN SPACE

Tony W0ORE and John W4NYZ are expected to board Shuttle Mission 51F which is due for launch on the 17th April this year. The query is will they be taking any amateur equipment?

ZS/S4/S8/V9

A nice collection and Dave WA2HZR hoped to actuate the areas of Venda V9, Transkei S8, Ciskei S4 and ZS0 during late November and early December last year. QSL to WA2HZR, PO Box 592, Mexico, NY 13114 USA.

THE USE OF VI3WI

It was a pleasure to do a little operating instead of listening all the time and the use of VI3WI allowed me to catch up with a lot of old friends.

The bands were kind from fifteen metres down and with the help of voluntary list takers in Europe which allowed me to overcome the lower Mediterranian QRM, I was fortunate to have 700 contacts and snare over 60 countries in the 20 hours that the rig was actuated by me on the 1st and 2nd of November.

Net controllers greeted me like a long lost friend, the "dog piles" were music to ones ears and one was pounced upon when calling CQ after asking if the frequency was clear. At one time I operated in the Novice segment of fifteen metres, to give them a chance at the commemorative prefix, then I began to feel guilty when propagation opened to Europe but I trust the spill over of activity allowed a few to work some new countries. If the ploy did not gel, apologies boys and girls.

All QSL's for VI3WI are either via the bureau or direct to VK3WI as per the call book address.

IDENTIFICATION OF BY CALL AREAS

The People's Republic of China licensing authorities have allocated blocks of call signs to the following areas as below. This will allow easier identification as more stations become active.

BY1AA — BY1ZZZ Beijing
BY2AA — BY2IZZ Hei Long Jian
BY2JA — BY2QZZ Jilin
BY2RA — BY2ZZZ Liaoning
BY3AA — BY3FZZ Tianjin
BY3GA — BY3LZZ Nei Mongol Z
BY3MA — BY3SZZ Hebei
BY3TA — BY3ZZZ Shanxi
BY4AA — BY4IZZ Shanghai
BY4JA — BY4QZZ Shandong
BY8AA — BY8IZZ Sichuan
BY8JA — BY8QZZ Guizhou
BY8RA — BY8ZZZ Yunnan
BY9AA — BY9FZZ Ningxia
BY9GA — BY9LZZ Quinghai
BY9MA — BY9SZZ Shaanxi
BY9TA — BY9ZZZ Gansu
BY0AA — BY0MZZ Xinjian
BY0NA — BY0ZZZ Xizang
BY4RA — BY4ZZZ Jiangsu
BY5AA — BY5IZZ Zhejian
BY5JA — BY5QZZ Jiangxi
BY5RA — BY5ZZZ Fuzian
BY6AA — BY6IZZ Henan
BY6JA — BY6QZZ Anhui
BY6RA — BY6ZZZ Hubei
BY7AA — BY7IZZ Hunan
BY7JA — BY7QZZ Guanxi
BY7RA — BY7ZZZ Guangdon

BITS AND PIECES

Dave ZL1AMM and Aola ZL1ALE back home and around the bands after a world trip. **Another tripper and contributor to this column back in VK is Eric L30042. **VK0AK a licenced YL is active from Mawson Base in the Antarctice. QSL to VK2DEJ. **FT8 looks to be the new prefix for Kerguelen. **4K1CEY is located in the Antarctic. **6D1FIC was a special event station in Mexico. QSL to K9AUB. **More BY stations will appear early this year. **The query re 4K1H Russkaya Base has been answered. The base which has been in operation since 1979 is located at 80 S and 105 W. (Thanks Bob W5KNE).

MORE CHANGES

The French Authorities, as from the first of this month, have implemented their new prefix structure for the five classes of licence designated A through to E. Visitors will not be issued with a French call under the new system but will sign F/their home call.

Class A and C licences are issued for VHF and UHF only. Class B licensees will have VHF privileges plus certain CW segments in the 7, 14, 21 and SSB plus CW on the 28 MHz bands.

Class D and E are fully privileged to use all bands, the E being for amateurs that have held a D rating for three years.

The F part of the prefix will remain in mainland France with the licence class added. For example all F2, F3, F5, F8 and some F6 licences will become FE2, FE3, FE5, FE8 and FE9 respectively. Other F6 operators with less than 3 years experience will become FD6XYZ etc.

Corsica has already changed from FC to TK and the French Antarctic and associated islands have changed from FB to FT. Other stations outside of continental France will be indicated with a number 1 through to 5 to indicate the class of licence in the prefix.

Confusing? Yes, but apparently the suffixes will remain the same and recognition of old friends should not be so hard. To appreciate the difference and confusion one could listen between 14.100 to 14.120 MHz, where the French operators congregate.

The commercial enterprises that produce QSL cards in that country must be clapping their hands for the chance of the extra Christmas work that they received.

WILLIS ISLAND

Willis Island is presently being activated by Peter VK9ZR on all bands, including 6 metres, after the changeover from Andy VK9ZA, last month.

Peter has had extensive experience of amateur operations at various meteorological stations including stints at Mawson Base and Macquarie Island, where he held the callsign VK0AP.

Gil VK3AUI kindly arranged for an EPROM to be programmed with Peter's new call for the manned 6 metre beacon.

QSLs either direct or via the bureau will be handled by Jill VK6YL.

THANKS

Sincere thanks go to the following. The Editors of weekly, bi-weekly and monthly newsletters including the ARRL NEWSLETTER, RSGB DX NEWS, QRZ DX, LONG SKIP, DX FAMILY FOUNDATION NEWSLETTER, JAN and JAY O'BRIEN'S QSL MANAGER LIST and KH6BZF REPORTS. Magazines including CQ, cqDX, QST, RADCOM, JARL NEWS, KARL NEWS, OZ, JARL NEWS, REGION 1 NEWS, WORLD RADIO, 73, BREAK IN and VERON.

Members who have contributed include VKs 2JM, 3FR, KS, XB, YJ, YL, 4BHJ, 6NE, 9ZA and G3NBC. Overseas amateurs include G1EOD, I8SAT and W5KNE. Sincere thanks and a happy and prosperous New Year to one and all.

SOME OF THE DX WORKED ON THE EAST COAST

15 METRES

3A2LF, 4Z4VH, C21BD, DA2ER, DK4QS, DL3AO, DU9RG, EA4BVE, F6AXP, F9RM, G3MCS, G4LIJ, HB9BXE, HL9XX, I1UJX, JA1-0, OH5NZ, LZ1TV, ON5NT, ON5OS, PA2JHO, S79CW, SP3JIA, SM5LI, UM8MU, UY5QQ, UZ6LTT, YB1BI, Y48UJ, Y54OL, YC9VGB.

20 METRES

4Z4DX, 4X6AR, 4X6IL, 6W2EX, 6Y5IC, 8R1RBF, 9H1EU, 9M2MW, 9M2PW, 9V1TL, A4XJW, A92DY, AP2AU, C21BD, C21RK, C21RO, CE0AA, CE0GBL, CE4HBZ, CP7GAE, FB8YK, G3MMN, G3RUV, G4KHG, GM3BQA, GW4YUX, HB9ARE, HL9YIC, HZ1AB, I8SAT, JA1-0, JY3ZH, JY4MB, KX6DS, LA9ZV, LZ1AT, N4AQA, N4KLL, ON4AMI, ON5NT, PJ2HB, SV1NA, T2ADE, T32AN, TI2CF, UA9AB, UA9CBO, UD6BD, UD6BY, UZ3AWO, UZ9AYA, VU2AU, VK9ND, VK9MR, VK9ZA, YI1BGD, YU2OM, XU1YL, XU1SS, ZL2BDF. ZL2BDF

40 METRES

3D2MP, CT1FL, CT4NH, EA6GP, EA9IE, EI6S, F9RM, I5VIT, IT9ZKW, LU1EAQ, ZL4QJ, ZL7PO, ZP5JCY.

AR

160 METRES IN THE NETHERLANDS

Since June 1984 the part of the 160 m band allocated to radio amateurs has been expanded to 1.825-1.850 MHz.

The following restrictions have to be observed:

1 1.825-1.835 MHz

(a) modes of transmission:

200HA1A	*2K20A2A*	*3K00R3E*	*1K20F1A*
200HA1B	*2K20A2B*	*3K00J3E*	*1K20F1B*
		3K00H3E	

(b) maximum output power 10 watts or 40 watts PEP.

2 1.835-1.850 MHz

(a) modes of transmission:

200HA1A

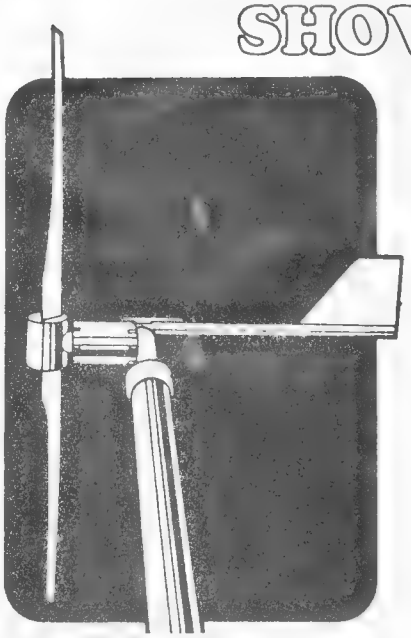
(b) maximum output power 10 watts

(c) no contest participation in this part.

from Region 1 News — Oct '84

AR

AR SHOWCASE



WIND TURBINE

Wecam Communications are importing the Rikan Hornet Wind Turbine which is an ideal source of power for charging batteries. It is a boon to many farmers, campers and those living in remote areas or for that "get away from it all" holiday home and the manufacturers claim it to be 150 percent more efficient than solar panels when tests were conducted in Auckland.

The units are packaged as a complete kit including battery leads, full instructions for assembly with the only tools required being a screwdriver, spanner and pop riveter. The unit is designed to fit 50 mm threaded pipe and included with the instructions are designs for simple six metre towers.

The unit has a rated output of 20 watts with a 20 knot wind and is designed for maintenance free operation in the harsh environment, having a fully sealed stainless steel shaft running in ball races, corrosion resistant ultra violet stabilised PVC blades, mechanical overspeed control and a fail safe device in case of high winds. All units are guaranteed for twelve months.

Further information may be obtained from Wecam Communications, 11 Malmesbury Street, Wendouree, Vic 3355 or by telephoning (053) 39 2808.

AR

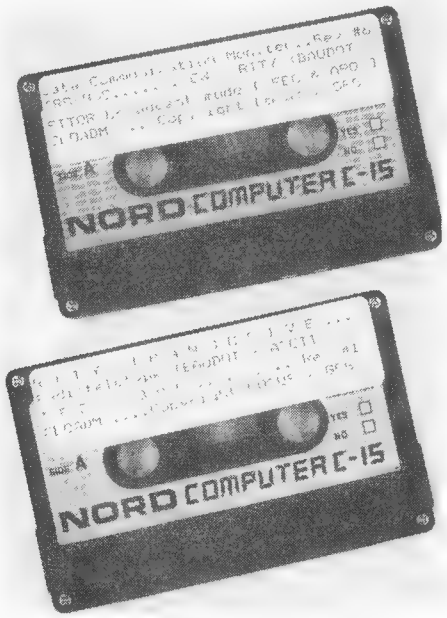
NEW EQUIPMENT SUPPLIER

Recently Fred Mackiewicz VK3ZZN returned to Melbourne to open new premises that will carry stock to serve the amateurs needs.

Fred was first established in 1976 and still provides the same standard of courteous service in 1985 and should make many friends with the stocking of major brands such as Icom, Kenwood and Yaesu equipment, as well as a quality range of accessories to suit.

For further details of the on-site full sales and service facilities that are available contact AM-COMM Electronics at 69 Canterbury Road, East Camberwell, Vic 3124 or telephone (03) 836 7634.

AR



RTTY — CW TRANSCEIVE AS WELL

Two new data communications programmes for the TRS-80C color computer, are written in Australia by Locus Software. The programme Data Communication Monitor (Cat DCM) provides for the reception of CW, standard BAUDOT RTTY as well as SITOR (Broadcast Mode), FEC and ARQ mode B. Stations using these RTTY modes include Press, Interpol, Embassies, Meteorological, Coast Guard plus a number of others. The RTTY transceive programme (Cat RBM) allows its user to run full transmit or receive on RTTY (BAUDOT or ASCII). Both programmes have been written such that they are extremely user friendly, regularly displaying on screen operating prompts and require a minimum 4K basic TRS-80C computer.

The Data Communications Monitor provides a number of user selectable options. These include, data output to screen or printer at 2400 BAUD, clear screen using CLEAR key, BREAK key initiates a break in the programme while retaining data on screen, operating status is easily displayed using a single entry key. In the CW mode DCM provides auto speed adjustment. When receiving RTTY BAUDOT the speed may be user set at 45, 50, 75 and 100 BAUD.

Designed to comply with CCIR recommendation 476-2 for SITOR (FEC and ARQ mode B) DCM has a number of unique features including a special graphic tuning display to allow optimum receiver tuning. Speed is preset at the standard 100 BAUD required for SITOR. Automatic data rephasing is carried out after four continuous characters are missed.

The RTTY Transceive programme (RBA) includes four transmit buffers, one for CW identification plus three additional with a capacity of 255,512 and 512 characters each. Also included is an auto RY transmit command.

When using BAUDOT, speeds of 45, 50 and 75 BAUD may be selected. The ASCII speed is preset at 110 BAUD.

Price of Locus DCM programme is $75 plus $5 P&P while the RBA programme is $55 plus $5 P&P. For further information contact the Australian distributors, GFS Electronic Imports, 17 McKeon Road, Mitcham, Vic, 3132. Phone (03) 873 3777.

AR

A T N ANTENNAS have been made distributors in Australia for Mirage Communications Equipment Incorporated.

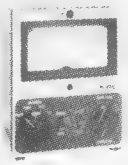
Mirage Communications Equipment Incorporated is a United States-based company who manufacture a large range of the highest quality amplifiers for 6 metres, 2 metres and 70cm. The product is covered by a five-year warranty on all items except the power transistors, which have a twelve month warranty.

The amplifiers are also available from our dealers Australia wide.

MP2 VHF Peak Reading Wattmeter

FEATURES: • 50 to 200MHz • Peak or Average Reading • Reads SWR directly — without extra charts or graphs • Remote Coupler Mounting • High quality meter movement

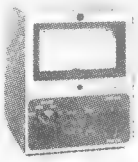
$169



MP1 HF Peak Reading Wattmeter

FEATURES: • 1.8 to 30MHz • Peak or Average Reading • Reads SWR directly — without extra charts or graphs • Remote Coupler Mounting • High quality meter movement

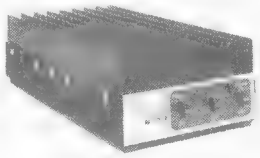
$169



B3016 2 Metre Amplifier

FEATURES: • Built-in receive preamp • Adjustable relay delay for SSB • Remote control operation with optional RC-1 Remote Head • Automatic internal or external relay keying

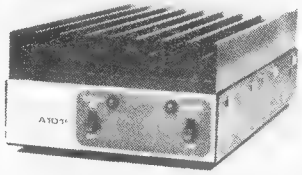
$339



A1015 — 6 Metre Amplifier

FEATURES: • Built-in Receive Preamp • Remote Keying • Remote Control Capablities • 10 Watts In — 150 Watts Out • All-mode Operation (SSB, CW or FM) • Built-in Thermal Protection

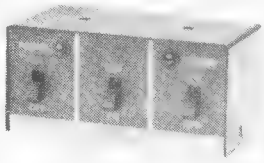
$399



RC-1 Amplifier Remote Control

FEATURES: • For remote control of all MIRAGE amplifiers except B23A, C22A and D24 • Small size for convenient mounting • Same attractive styling as all MIRAGE products • Allows for trunk or under seat mounting of amplifiers

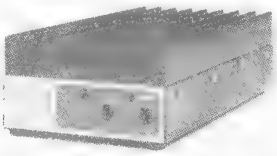
$36



D3010 430-450MHz Amplifier

FEATURES: • All-mode FM, SSB, CW, ATV • Adjustable delay for SSB • Remote control operation with optional RC-1 Remote Head • Hi-Power Input

$409

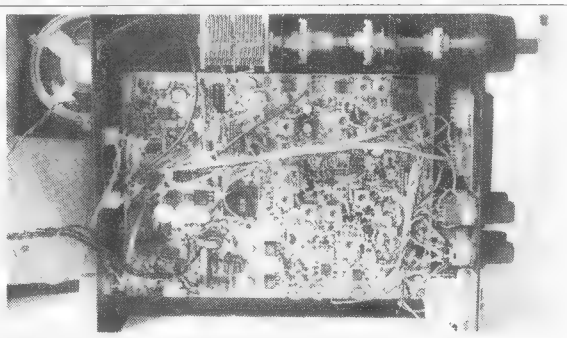


ATN ANTENNAS 56 CAMPBELL ST. BIRCHIP 3483 PHONE (054) 92 2224

AUSKITS PROP: H & V A GRANT, VK3AZG, TEL: (03) 795 8717

5 AMBLECOTE CRES, MULGRAVE, VICTORIA, AUSTRALIA, 3170

For those of you who wonder what our kits are like the following should dispel any doubts you have. All our kits are imported from UK with the majority of them being the outcome of published articles in the English magazine "HAM RADIO TODAY". The design and kit building instructions are done by G3WPO and G4JST, with the kits sold in UK by WPO Communications. AUSKITS was set up to try and provide amateur radio style kits to the Australian market, where kits have not generally been available before.



Speech processor using Vogad kit	*$28.50*
VHF 2 m mini/synth VFO kit	*$87.99*
Audio active filter kit	*$37.99*
DSB/2 80 or 15 m QRP DSB/CW transceiver kit PCB/s and components 137-50 or with case/meter/knobs/and digital display kit	*$239.99*
2 m low/noise rec/preamp kit	*$11.99*
2 m FM transceiver kit	*$137.99*
2 m rx/only kit	*$79.99*
2 m tx/only kit	*$66.99*
ALPHA mono/band 160 or 80 m HF 50 watt PEP output transceiver SSB/CW kit	*$399.00*

Send long stamped envelope for catalogue or enclose $1.00 for a reprint of any one of the kit instructions or telephone for more details.

PLAQUE PRESENTATION

From left are Michael VK3KI, Alf VK3LC and David VK3ADW.

At a recent executive meeting Alf Chandler VK3LC received an engraved plaque for his work as the Region 3 Intruder Watch Co-ordinator for the period 1975-1984.

This award is made available for amateurs who have contributed to the region's work.

The plaque was presented to Alf, on behalf of Region 3, by Michael Owen VK3KI, who is a Director of that body.

In presenting the plaque, Michael stated that "Intruder Watch involves a high degree of dedication and accuracy which not many amateurs are prepared to give for long periods. As a result of the work of Intruder Watch there are not too many intruders removed but raising the issue, and continuing to do so, many would-be intruders are deterred".

Alf replied, commenting that he had enjoyed his long association with the Region and the plaque was much appreciated.

VHF UHF - an expanding world

Eric Jamieson, VK5LP
1 Quinns Road, Forreston, SA 5233

All times are Universal Co-ordinated Time and indicated as UTC

AMATEUR BANDS BEACONS

Freq	Call sign	Location
50.005	H44HIR	Honiara
50.008	JA2IGY	Mie
50.020	GB3SIX	Anglesey
50.075	VS6SIX	Hong Kong
50.109	JD1YAA	Japan
50.945	ZS1SIX	South Africa
51.020	ZL1UHF	Mt Climie
52.020	FK8EM	Noumea
52.033	P29SIX	New Guinea
52.100	ZK2SIX	Niue
52,150	VK0CK	Macquarie Island
52.200	VK8VF	Darwin
52,250	ZL2VHM	Manawatu
52.300	VK6RPH	Perth
52.310	ZL3MHF	Hornby
52.320	VK6RTT	Carnarvon?
52.325	VK2RHV	Newcastle
52.350	VK6RTU	Kalgoorlie
52.370	VK7RST	Hobart
52.420	VK2RSY	Sydney
52.425	VK2RGB	Gunnedah
52.440	VK4RTL	Townsville
52.450	VK5VF	Mount Lofty
52.465	VK6RTW	Albany
52.470	VK7RNT	Launceston
52.490	ZL2SIX	Blenheim
52.510	ZL2MHF	Upper Hutt
144.019	VK6RBS	Busselton
144.420	VK2RSY	Sydney
144.465	VK6RTW	Albany
144.480	VK8VF	Darwin
144.550	VK5RSE	Mount Gambier
144.600	VK6RTT	Carnarvon?
144.800	VK5VF	Mount Lofty
145.000	VK6RPH	Perth
147.400	VK2RCW	Sydney
432.057	VK6RBS	Busselton
432.159	VK6RPR	Nedlands*
432.410	VK6RTT	Carnarvon?
432.420	VK2RSY	Sydney
432.425	VK3RMB	Ballarat
432.440	VK4RBB	Brisbane
1296.171	VK6RBS	Busselton

* *Thanks to the VK6 VHF Group Bulletin for advice of the Nedlands beacon on 432.159. They also query whether the Carnarvon beacons are running. If they are could someone please advise me.*

? *The VK6 VHF Group also asked if VK6RVF on 10.3 GHz is operating? Do you know?*

ABOUT CHINA FROM JAPAN

Hatsuo Yoshida JA1VOK, a well known 6 metre operator from Japan has written with a few details of 6 and 2 metre activity from China where the prefix is normally BY. However, BT5RA is the call sign of a special VHF club in Fuz hou city, and JA1VOK contacted this station on 13/8 and 19/8/84. Others to work the station were JA1UT, JH4RUG and a group from the BY Club station. Signals were 5x9 both ways. It seems likely that BY5RA will also be on 6 metres.

On 2 metres, BT5RA worked a JR6 in Okinawa on 17/8 by tropo, which probably rates as a first for that band between those two countries.

As it appears the Chinese government only issues licences at present to club stations, it seems unlikely we will be rushed with keen VHF ops from there for the time being, but contacts should be possible when conditions permit operation with Japan.

Further information regarding BY operations was included on page 37 of November 1984 "AR".

SIX METRES

It's that time of the year again when one looks with expectation to the six metre band and hopes for Es openings to renew old acquaintances and make new friendships. Until the last few days the band has been relatively quiet, there have been the odd contact "out of the blue" but generally nothing consistent. Channel 0 mainly from Brisbane can be heard frequently, sometimes very strong, at other times in and out of the noise, but remarkably consistent.

Bob VK5ZRO (my very consistent band spy) advised that on 2/11 ZL worked FK8 on 6 metres but nothing heard here. On 7/11 (2230 UTC day 6/11) Ch 0 from Sydney was available in full colour. At 2250 Bob worked VK2AKU 5x8 and again at 2330 5x9; at 0002 VK7JG 5x9; 0005 ZL1AON 5x5 and 0016 VK7DC 5x6. For the next two hours signals drifted in and out but not lasting long enough for contacts. No signals were heard from the north.

Also on 7/11 VK2 were working ZL1, and VK2AKU worked VK3, 5 and 7. The VK2RHV beacon on 52.325 was audible at the same time (0000 UTC). At 0453 Bob VK5ZRO worked Graham VK6RO 5x3. At 1000 UTC VK8TM and VK8ZLX were up to 5x9 on 52.070.

It certainly looks as though there was a fairly large Es cloud around, which eventually involved the western areas and the north. With signals so good so early it may be that we will be in for a good Es season this year. And of course keep your ears on 2 metres as well, especially when the skip shortens.

Opening Ceremony of BY5RA.

ON 1296 MHz

Bob VK5ZRO and Don VK5ZRG at Whyalla, 210km apart, continue to exploit 1296 MHz. They have been having consistently good contacts at any time of the day or night. Both being on holidays helps of course! They have found the daytime signals are subject to more QSB than at night, frequently very heavy QSB varying the signals between S1 and S9+60dB! The same peak strength of signals applies at night but the signals do not drop as low when they fade down.

All these experiments have been carried out with a maximum power of 13 watts, and from 25/10 Don VK5ZRG has had an improved antenna system with four 27 element loop yagis, while VK5ZRO uses either one 27 element loop yagi or a 4 feet dish. Bob has found that with the two antenna systems about 4 metres apart he is getting some diversity effects, sometimes the signals are better with the loop yagi, at other times with the dish!

Recently experiments were conducted using 1 watt between the two stations with little apparent reduction in signals so one wonders just how far the signals on this band could be transmitted on a regular basis, perhaps double the present distance, who knows until it is tried.

The regular experiments between the two stations on 432 MHz has been temporarily suspended whilst they find out the vagaries of 1296. It seems these two operators have been having more success with the FM signals than originally anticipated. There does however, seem to be a ceiling above which the signals are not propagated satisfactorily, as Sid VK5ME has had some difficulty copying VK5ZRG from his elevated site in the Adelaide hills, although he receives tremendous signals from VK5ZRO.

NEWS FROM JAPAN

From the Japan "CQ ham radio" magazine for September 1984, I note Graham VK6RO has acquainted JA operators with the latest DOC regulations regarding our operations on the 50 MHz end of the band, so they will now have some idea of where and when to look for signals.

I note also that the JA's haven't been working too far afield on six metres either. Stations worked included JD1DCK, HL1, 2, 3, 4 and 5, VS6 and VK8GB.

ON TWO METRES

The English "Short Wave Magazine" for September 1984 (per favour VK5AIM) has a photograph of a QSL card which confirms the present IARU Region 1 distance record of 2787 kms on 432 MHz between EA8XS, Canary Islands and GW8VHI, which was made on SSB on 5/7/84 at 2226 UTC.

Congratulations to the parties concerned, and it is good to see some of these distances being lengthened

in the European sector again.

The same magazine carries considerable information regarding contacts made particularly on two metres using auroras for propogation. Such occurrences are fairly rare in this country. Our northern friends also make good use of the various meteor showers throughout the year, something we don't seem to worry about here.

The annual CW ladder in "Short Wave Magazine" shows GW4TTU as heading the list with 247 contacts on two metres all with different stations on CW. He also has 53 on 70cm, and 10 on higher bands. G4ARI is next in line with 193 different stations on two metres, and in addition has 67 stations on four metres.

GW4TTU also heads the annual VHF/UHF table with 90 counties and 36 countries worked so far this year on two metres, 41 counties and 10 countries on 70cm, and 11 counties and 4 countries on 23cm! The penetration of VHF/UHF into Region 1 is quite remarkable, and surely 36 countries even in Europe must be considered quite an effort, especially as language problems must surely arise at times, and QRM due to station density in some places would not help either. Europe from Portugal/Spain to most of European Russia is about the same width as Australia is from west to east at the widest points!

BEACON FOR NEW CALEDONIA

John VK4ZJB has written a hurried note advising he worked Pierre FK8EM on the morning of Tuesday 6/11. During the six metre contact mention was made that a beacon would be operational from about 13/11 specifically beaming for VK stations.

Frequency: 52.020 MHz, power: nominal 5 watts; antenna: Swiss Quad with 12dB gain; direction: WSW from FK8; Time: 8 am to 10 pm FK8 time, which should be about 7 am to 9 pm EST or 2100 to 1100 UTC.

Distance wise, New Caledonia should be similar to working New Zealand for most, perhaps a bit closer for the east coast stations, but well within the capabilities of an Es opening. And remember to keep your contacts short with Pierre as there will be a lot of six metre operators wanting to work him and openings may not be of long duration. If they are, then there will be plenty of time to call him up later and talk about the latest piece of gear you have bought!

While on the subject of beacons I note from "Break In" that the Manawatu Branch are to close down their 70cm and 2 metre beacons for economic reasons! Apparently after a survey it was found people only looked for the six metre beacon which has been allowed to continue.

THIRTY YEARS OF BEACONS

The following is condensed from an interesting article in the "West Australian VHF Group Bulletin" for October 1984.

"Amateur beacons have been operating from Perth for nearly 30 years. The first amateur VHF beacon in Australia was VK6VF on 50.003 MHz in the mid 1950s. Built by the late Don Brown VK6ZAV, it had a neon valve relaxation oscillator feeding a 6V6 valve which screen modulated an 807. It was keyed by a notched disc driven by a synchronous motor through a rubber band actuating a mechanical switch. Unattended operation was not permitted at the time so VK6VF was heard irregularly when the operator was present and remembered to turn it on!

"The first two metre beacon was located at VK6BE in Kalamunda, then it was moved to VK6RX in Subiaco, to VK6HK in Wembley Downs and VK6AW in Tuart Hill. At this time a valve tripler was added, making it the first 70cm beacon in WA and possibly in Australia. The keyer was an SEC power meter to provide the slowly revolving disc, with tabs attached to interrupt a light beam which was detected by a transistor with the casing filed away to make it photosensitive. By informal agreement it was moved to the TVW7 site at Bickley where the antenna was only a few feet off the ground, so it was replaced by the current solid state dual band beacon relocated part way up the transmitter tower. It operated almost continuously for 13 years. Only recently the keyer was rebuilt by Phil VK6AD to change the ident to VK6RPH. A formal agreement is being made with TVW7 for it to be replaced on the tower.

"Another first for Perth was VK6RVF, constructed by Colin VK6CM several years ago and located at Roleystone, and transmitting on 10.3 GHZ. Then there was the recent addition of VK6RWA on 10 metres. Though strictly not VHF the ionosphere is currently ignoring it so it might as well be on VHF!

"The newest Perth beacon is VK6RPR at the Nedlands CAE transmitting on 70cm. A tripler is being built so it will also transmit on 1296 MHz. Perth will then have a set of beacons on all bands from 10m through to 1296 MHz.

"Beacons have also been erected at Busselton with the call sign VK6RBS and have been operational for about a year, and are designed to test propagation northwards along the coast and eastwards towards Adelaide. The 144 MHz exciter and 1296 tripler were built by Wally VK6KZ, the keyer and 432 tripler by Don VK6HK, the 144 MHz power amplifier built by Barry VK6ZSB and the power supply built by VK3TN/6ZK/8TN.

"The basic concept of the beacon is to generate enough power at 144 MHz and transfer it up the mast to a second module near the antenna. This module divides the power so that part is radiated and part is tripled to 432 MHz. This is again divided with part being radiated and part being tripled to 1296 MHz. The power dividers are ex NASA courtesy Bob VK6ZFY with 50 ohm dummy loads rated at 10 watts to absorb power if an antenna falls off.

"The antennas on 2 metres are 2 x 5 element yagis built by Bob VK6KRC and are aimed at Adelaide and Perth. On 432 MHz there is an extended 1½ wavelength dipole with a screen reflector giving a tri-lobed pattern aimed roughly at Adelaide, Bunbury and Perth/Carnarvon, and was built by Don VK6HK from a standard VHF broadcasting design. Don also built the antenna for 1296, a balun/dipole combination with a corner reflector aimed at Perth.

"The keyer, power and exciter modules are contained in a security box in the Geographe Bay Yacht Club. Output is around 40 watts at 144.019. This is transferred by good quality coax to the divider/multiplier module about 7m up the tower. After coax losses power delivered to this module is about 25 watts. The 2m antennas get about 5 watts each for an ERP of about 30 watts. The tripler produces about 5 watts on 432.057 MHz. After the power is divided there is about 2 watts for the antenna, producing about 5 watts ERP in the favoured directions. The second tripler is inefficient due to an ageing varactor and the output at 1296.171 MHz is only a few hundred milliwatts, boosted by an antenna gain to about 2W ERP.

"In less than a year VK6RBS has demonstrated remarkable propagation. It has been heard as far north as Exmouth on 144 MHz, and on 432 MHz has been heard by VK6ZPG at Gunyidi, north of Watheroo. VK6ZFY reports hearing it most days on 1296 MHz around Perth."

The congratulations of the VHF/UHF fraternity is extended to these good people who have spent so much time and effort in providing very useful instruments for your use, and the closer you are to them and thus the more reliable they are, the more useful you will find them. And many has been the time that a beacon has warned an alert operator that the band could be opening and possible contacts made. We are indeed fortunate in Australia that with a country as large as it is, there is such an all embracing network of beacons on so many bands ready and waiting to give warnings to anyone who cares to listen. Long live the beacons!

That about wraps it up for this month. Due to printing deadlines there is a shorter period for reporting this time, and most DX operating will start the day after this is posted!

Closing with the thought for the month: "A man is three people — what he is, what he thinks he is, and what others think he is." 73. The Voice in the Hills. Greetings for the New Year. **AR**

New Federal Awards Manager:
Bill Hempel VK4LC, QTHR.

Oricord welcome here

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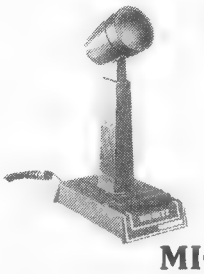

444D DESK-TOP MICROPHONE

MODEL 444-D

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PACKET RADIO

David Furst, VK3YDF
131 Church Street, Hawthorn, Vic. 3122

THE FUTURE

Packet Radio, as we have seen in previous articles on the subject, transmits information a few characters at a time, packaged, checked and addressed. This allows things like several QSOs at the same time, on the same frequency, without errors and without interference. (You really should have read the article in May '84 AR more closely.)

Because this information is all in the form of packages with labels on them we can identify each packet from the others and deal with it individually. All of Packet Radio is controlled by dedicated microcomputers — the rigs, the repeaters, etc and this makes it possible to programme these computers to do all manner of things.

A Packet Radio repeater listens to a given channel receiving, storing and checking all the packets that are flying past. If a packet has information within it which says that it is meant to be repeated then the repeater waits until the channel is free for a moment and then retrieves the packet from its memory, modifies it to say that it has passed through the repeater, then retransmits it. On the other hand, the repeater may see packets from a simplex contact. It will examine them as it sees them, but it will know that it is not meant to take any action.

An interesting situation appears when a station receives two packets from the other station with which it is having a contact: one from the other station direct, and one via the repeater (which is possible because this is all happening on a single channel). In this case the receiving stations microcomputer knows that it is supposed to be operating via the repeater, and it will ignore the packet it received direct.

If we consider the Packet Radio network like a postal system (which it emulates very closely) what we have been doing with the local repeater is just sending mail around our local postal district. This is all very fine, but occasionally we wish to send a letter to someone not in our own suburb. In this case we post it to our post office, it posts it to the post office in another district, and that post office posts it to the person we addressed it to.

Packet Radio allows us to send a packet to our local repeater, which sends it to the repeater in another area which delivers it to the person we addressed it to. This process takes only a matter of a second at most. A contact actually consists of many packets being sent back and forth through the system. This all operates in much the same manner as ongoing correspondence conducted via the postal system.

It bears pointing out at this point that this is where the similarity between Packet Radio and the postal system ends. Packet Radio works reliably.

The technology is developing such that it will be possible in less than twelve months to have a 'Packet Briefcase' containing a two metre rig, a Packet Radio rig, a portable computer and a battery which will allow us to tap into the local repeater.

At the same time interstate links have been developing, and it will be possible to ask the local repeater to 'connect' us to an interstate repeater. The interstate repeater can be asked to further connect us to a station in its local area. In 1985 we may be using our briefcase to play games on a computer which is in a different state!

Packet Radio combines radio and computer technologies to provide a reliable and efficient communications medium. This makes things such as the Computerised Bulletin Board System possible. The CBBS, as it is known, has become a fixture of the Amateur Computing community.

The CBBS is a computer system running a specially written programme which makes it imitate a bulletin board such as you would expect to find in a community centre. At the community centre you would stand back from the board and scan the headings on all the messages tacked onto it. Once you found a message of interest you would move forward to read it in more detail. The CBBS operates in a similar fashion.

The Packet network will let you use your own keyboard and screen to type instructions and messages into the CBBS. You might ask it to type out the headings of all the most recently placed messages. After scanning these you might decide that one or more messages sound interesting and ask it to type them out in full

Many people find it interesting to scan all messages on a CBBS and reply to most of them. Some people prefer to simply read what everyone else is up to. Others like to correct the mistakes anyone else makes, while some correct the correctors. You may check the CBBS at any time of the day or night and receive messages from, or leave messages for, people who are not near a rig at the time. The CBBS becomes the hub of a community where no-one has to call another station all week on the repeater before they get them.

Another kind of service which has become popular in the amateur computing community is the Remote CP/M System or RCP/M for short. As well as having a small bulletin board facility it can act as a remote CP/M computer system which you can load programmes onto for others to download into their own computers. These systems have become an extremely efficient method of distributing public domain programmes around the hobbyist community.

There have been concerns expressed about people using Packet Radio for illegally copying programmes to which they have no right. In theory this is possible, however because of the public nature of Packet Radio transmissions, such conduct would be much too obvious for anyone to attempt it without being found out.

Other areas of amateur radio (notably two metre repeaters) have problems with policing reasonable standards of conduct. We believe that Packet Radio is inherently self policing. If anyone behaves irresponsibly, he is immediately identified by the signature in his packets thereby denying him anonymity. If this continues then comments will begin to appear on the Computerised Bulletin Board System. In the fullness of time this may become a full scale public debate on this persons behaviour, and if the community feels that action is warranted, they may bar this person from accessing the various systems hooked up to the network or perhaps even from the network itself.

The Amateur Computing community has been using CBBS and RCP/M systems for several years via the telephone system and appropriate modems hooked up to their computers. They are technical people after all the best traditions of amateur radio and we have much in common with them. They have as little knowledge about linear electronics as many of us have in the area of computing. We believe that there is an enormous amount to be gained from communication between these two communities and would like to see CBBSs and RCP/Ms which can be accessed from both the telephone system and the Packet network.

There is concern over CBBSs and RCP/Ms with access both by radio and by telephone. We agree that if it were possible to ring in on phone and go out on Packet this would be a most undesirable situation. It is not now, nor has it ever been our intention that this be possible.

A second area of concern is that there may be unsuitable material on the CBBS which should not be transmitted over the air. We do not see this as a insurmountable problem. No-one looks at all the messages 'blind'. All CBBSs have a summary of message titles which are scanned for material of interest and the messages are then selectively retrieved.

In 25,000 odd calls to the Microcomputer Club of Melbourne (MICOM) CBBS it has been extremely rare that any offensive messages have been left. The trend is now that much as anyone can look at the contents of a CBBS, only people with an appropriate password may leave messages, and any message left automatically has the name of its originator associated with it. This system can kill off distasteful messages entirely.

Other areas of Packet Radio which people are showing interest in are: Bulletin Boards on satellites, using meteor showers to reflect packet transmissions, store and forward satellites to hook countries and continents together, etc.

Many of us are working toward this bright future. We expect it to bring a flood of new techniques and people to enrich Australian Amateur Radio.

Note: David is most willing to answer any queries regarding Packet Radio that members may have. Drop David a note at the above address and he will answer any questions in this column.

AR

QSP

INTERNATIONAL 28 MHz BEACONS

The following is a list of beacons operating on 28 MHz.

Freq	C/S	Location
28 175	VE3TEN	Ottawa
28 2025	ZS5VHF	Durban
28 205	DL0IGI	Mt Predightsstuhl
28 2075	KE4NL	Sarasota Fla
28 210	3B8MS	Mauritius
28.2125	ZD9GI	Gough Island
28.215	GB3SX	Crowborough
28 2175	VE2TEN	Chicoutimi Que
28 220	5B4CY	Zyyi
28 2225	HG2BHA	Tapolca
28 2275	EA6AU	Palma
28 230	ZL2MHF	Mt Climie
28 235	VP9BA	Bermuda
28 2375	LA5TEN	Oslo
28 2425	ZS1CTB	Capetown
28 245	A92C	Bahrain
28 250	Z21ANB	Bulawayo
28 2575	DK0TEN	Konstanz
28 260	VK5WI	Adelaide
28 262	VK2RSY	Dural
28 264	VK6RWA	Perth
28 266	VK6RTW	
28 270	ZS6PW	Pretoria
28 2725	9L1FTN	Freetown
28 2775	DF0AAB	Kiel
28 280	YV5AYV	Caracas
28 284	KA1YE/B	Henrietta NY
28 285	VP8ADE	Adelaide Island
28.2875	H44SI	under construction
28 295	VU2BCN	Mt Matilda
28 295	VU2BCN	New Delhi
28.296	W3VD	Laurel Md
28 300	PY2AMI	Sao Paule
28 3025	ZS1STB	Still Bay

from Region 1 News — Oct '84

AR

ALARA

Australian Ladies Amateur Radio Association

Margaret Loft, VK3DML
28 Lawrence Street, Castlemaine, Vic 3450

Well our ALARA contest is over again for another year and I do hope by the time you are reading this that I have received your log, results will be out very soon.

Propagation was not too favourable but some very good scores were being passed on by some of the ladies. My very sincere thanks once again to all who participated and especially to the OM's, I overheard one say he was only worth 3 points so wasn't as popular as the YL's but those 3 points add up and help to boost our score. So come on fella's join us next year it's all good fun.

Mavis was very popular this year with the commemorative call VI3WI and logged up a good score. Unfortunately 80 metres was washed out by the electrical storms experienced on Saturday night so a lot of contacts were lost.

NEW MEMBERS

Welcome to new members Aimee FK8FA 22.10.84 and Mary KB6CLL 27.10.84.

Subscriptions are now due and Valda VK3DVT, PO Box 4, Middle Brighton Vic 3186 will be very happy to answer any enquiries and delighted to receive your subs. Australian membership is $5 per year; and if you would like to sponsor an overseas YL cost is $3 for the newsletters to go sea mail. $5 for airmail.

ALARA MERCHANDISE

ALARA also has available Badges and Charms (for keyring or chain) $4 each post paid, $3 if collected.

Teaspoons boxed $4.50 posted. $3.50 collected. These all depict our logo and are most attractive.

ALARA notepaper is also available 50 sheets $3 posted $2 collected.

YL DAY

On YL activity day 6th January a roster of VK3 members will be using the call VI3WI so look out for us on the usual YL frequencies 21.188, 14.288, 28.588 MHz and also on 3.588± QRM in the evening.

ALARA net times for daylight saving times are Monday 3.580 at 1000 UTC this will revert to 1030 UTC early in March.

LOOKING BACK

Looking back over 1984, the main highlight must be our first Annual Get-together and certainly this will be followed by others in the future.

YL's are becoming more active at zone and club levels and in the coming years I hope this continues. No I am not becoming sexist but feel that everyone has something to offer and a different approach will benefit all.

Publicity for our hobby has continued this past year. Jenny VK5ANW was interviewed on radio station 5SE; Joyce VK2DIX was interviewed for their local paper; Mavis VK3KS and Ivor VK3XB were interviewed for 3RPH the radio station for the print handicapped in Melbourne.

Mavis also was featured on the cover of 1984-85 Call Book. Other milestones in 1984 were the presentation to Austine VK3YL who has been licensed for 54 years.

The presentation to Helene VK7HD our president of The Mrs McKenzie CW Trophy who accepted this on behalf of ALARA and this will be suitably housed and a certificate presented to our top CW scoring novice YL in our contests.

Kim VK3CYL and Valda VK3DVT for receiving commendations for their entries in the WIA 75th Logo competition.

Judy VK5BYL conducts the slow Morse practise on Friday nights for the WIA on 3.550 MHz at 1030 UTC.

Above

Marlene VK5QO, Carol VK5PWA, Jenny VK5ANW and daughter Wendy, Joy VK5YJ and grand daughter Rebecca.

Below

Norma VK2DJO; Judy VK5BYL; Rae VK3AYL at Mildura.

Carol VK5PWA is president of the Lower Eyre Peninsula ARC. Val VK4VR is Junior Vice President and Liaison Officer in the VK4 Division.

Wishing everyone a very happy, healthy year for 1985.

Until next month 33,73,88 to all.

Margaret VK3DML

WICEN NEWS

Jim Linton, VK3PC
4 Ansett Crescent, Forest Hill, Vic. 3134

Recognition, restructure, & revival — the three Rs of WICEN Victoria since Ash Wednesday.

Continued from December AR

WICEN Co-ordinator Derek McNeil VK3BYA outlines the post-Ash Wednesday restructure of WICEN.

Ash Wednesday was undoubtedly the catalyst necessary to bring WICEN Victoria back to life again. Not that it had died, but its numbers were down to approximately thirty loyal dedicated members. Whereas there are a few good emergency operators who manage to retain their ability without practice, it was evident many people would be far more effective in the field if they had some training and took part in the occasional exercise between emergency call-outs.

Ash Wednesday also revealed the need for good administration of WICEN resources and standardisation of operating procedures to ensure maximum operability between WICEN members and between WICEN and other emergency agencies.

Apart from those issues, WICEN was no longer part of the Victorian State Disaster Plan and, naturally enough, few people knew what WICEN stood for, what it could do or how to use it.

So began the Three R's of WICEN Victoria.

On 12 November, 1983, a general meeting of WICEN (Vic) appointed a Steering Committee to review the present organisation, recommend improvements — and where necessary, recommendations should actually be implemented in view of the imminent high risk fire season.

The Committee set to work immediately addressing the following matters:

— to identify and confirm the role of WICEN,
— to renew contact with other emergency services,
— to re-establish WICEN in the State Disaster Plan,
— to create greater awareness and understanding of WICEN within the Amateur Radio Service and the general public,
— to prepare a set of base level, standard operating procedures for use by all operators,
— to set up administrative procedures for membership recording, operator rostering etc,
— to review and confirm the State structure and regional boundaries.

Many of these tasks were completed by 31 March, 1984, when the next WICEN General Meeting was held. Some tasks were still in progress and have been continued since then.

It's of major significance that WICEN representatives now take part in disaster planning meetings at Regional and State levels and have been invited to participate in a number of emergency services seminars.

RECOGNITION? Yes, WICEN is now looked upon as an essential communications resource and there's a great obligation on members of the WIA Victorian Division, who, of course, called for the WICEN review, to make sure they can respond to the demands likely to be placed upon them.

RESTRUCTURE? Regional boundaries have been defined, regional representatives nominated and a central co-ordinating group established. Administrative procedures are being formulated and installed. Communication hierarchies have been set-up to ensure a quick assembly of operating groups.

REVIVAL? Yes, a partial revival has been achieved and a number of new club-based groups have sprung up in the past twelve months preparing themselves fairly well. The ultimate test is the next emergency/disaster callout. There are many operators who, only awaiting the next Ash Wednesday, will submit to neither practice nor training and, until that day, make no contribution to the furthering of WICEN. They have their uses — in making cups of tea!

The (other) Three R's of WICEN Victoria: Responsibility, Reliability, and Readiness.

AR

PACKET VIA METEORS

The recent Perseids meteor shower provided a good opportunity for experimentation with packet radio operation via meteor scatter. Various stations in the USA took part in tests, and W0RPK and K1HTV completed what is believed to be the first packet radio contact on 144MHz using MS. The tests were performed at 1,200 Bauds using AFSK FM: this mode was used in order to allow as many stations as possible to take part in the tests, although a sacrifice in performance was involved.

from Rad Com — Nov '84

AR

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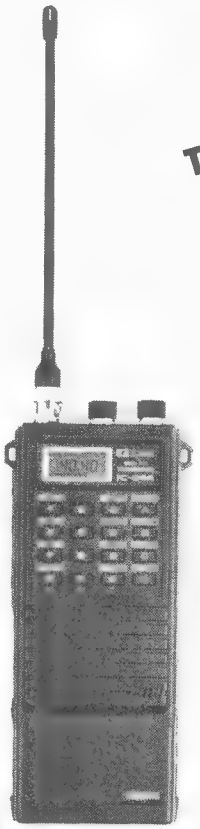

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WICEN NEWS

Ron Henderson VK1RH
FEDERAL WICEN CO-ORDINATOR
171 Kingsford Smith Drive, Melba, ACT 2615

NATURAL DISASTERS ORGANIZATION

During the first quarter of 1984 Air Vice Marshal John Lessels took over as Director General of the Natural Disasters Organization from Major General Ken Lachford, who retired. AVM Lessels is a civil engineer and was formerly head of Air Force works. He was briefed on WICEN by the Federal Co-ordinator in early November.

NDO ANNUAL EXERCISE

WICEN was advised in late October that the annual NDO command post exercise for 1984 would be an all in-house activity and there would be no requirement for a WICEN communications demonstration. The exercise scenario is one of a disaster occurring on one of our South Pacific island state neighbours and as it will be fully simulated in Canberra any communications to the nation might cause unnecessary alarm. Perhaps if procedures are tested this year NDO might extend their scope next exercise. You will recall that last year WICEN provided communications to an Australian Territory, Christmas Island, for the annual exercise.

COMMUNICATIONS EQUIPMENT CONNECTORS

You will recall that earlier in 1984 I reproduced a UK RAYNET article on communications connectors. Paul Webster VK2BZC has written in response to that item and his letter is reproduced below. Whilst interoperability is a worthwhile goal, it does not need to be achieved nationally, or even state wide as its greatest application is at the local WICEN group level.

Dear Ron,

I am most impressed by the (reprint) article in July AR '84. My interest stems not only from some small interest in WICEN, having taken part in a few City-to-Surf exercises while not a paid-up WICEN member (last year in fact, in my professional capacity instead), but also from considering the problem of patching together equipment in the shack, such as RTTY gear or a land-line interface, and the possibility (distant) of building a central control panel for a variety of rigs.

The Raynet idea as described sounds excellent, and for the moment, I an implementing it on my equipment for the above purpose. Discussion with my father, Jim VK2BZD who, as the Callbook would have him, lives in Sydney still and who IS a paid-up and active WICEN member, revealed a local standard already in use in Sydney. In case you are unaware of this, it consists of a 5 or 6-pin 270-degrees DIN connection making, I assume, the same usage of the 'sexes' as the Raynet standard, and has the following pin allocations:

1. +12V supply
2. Audio Output
3. Ground
4. Microphone
5. PTT
6. 'Busy' (Optional)

The 'Busy' control line is most useful, implemented in the rig by an NPN transistor switching to ground, with base drive current adequate to allow sinking of at least 200mA in the 'ON' state when the mute is opened. A suitable cross-connect lead (which must contain attenuators in each direction) then allows two rigs on different bands, or on the same band separated by a suitably great distance, to be used as a repeater. Back EMF protection should always be (and usually is) applied to the T/R relay in the set. Just in case, a 24V zener can be connected across the 'Busy' transistor.

The obvious extension of the Raynet plan, therefore, is to use 8-pin DIN connectors, which are at present (in Sydney) as readily available as the 7-pin variety, and which are compatible with them in the same way as the 6- and 5-pin 270 degree types. The (off-) centre pin then has the same function as in the Sydney standard.

Jim has, on my behalf, put this idea to Sydney WICEN who rejected it for several reasons:

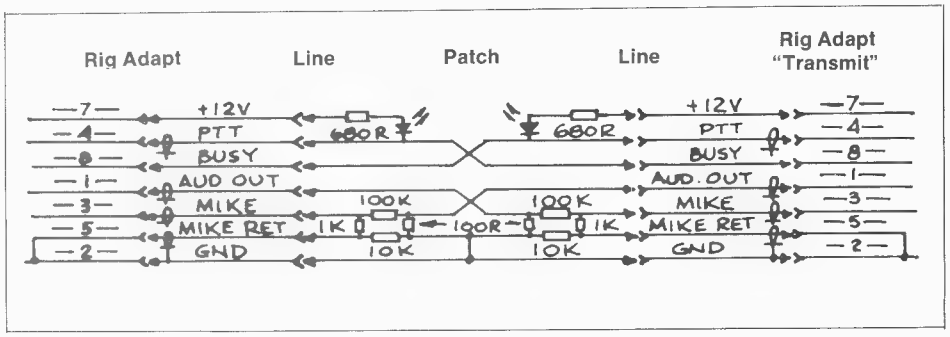
1. Multi-pin fittings too fiddley for OM's to wire.
2. Secondary output circuit is not necessary.
3. Nobody uses balanced mike circuits.
4. It doesn't follow DIN standard pin definitions.

I cannot completely agree, however, with these arguments, or to put it another way, I am still entranced by the Raynet plan, plus the obvious adaptation for the 'Busy' line. My replies are:

1) There is very little difference in pin spacing between 5- and 7-pin 270 degree fittings. The 'centre' pin is equally difficult to solder (and should be done first). If, however, one is only using 3- or 5-pin 180 degree fittings, these are quite easy to solder, decent quality ones having a separate large tab for pin 2.

2) The original article explains this.

3) While balanced mike circuits are rarely seen since the era of the AWA carphones, the mike return is of tremendous value in reducing interference and hum (whine etc). Careful analysis of the construction of attenuators reveals that if the ground legs are taken to their respective returns, then 'Earth Loop' signals are attenuated also:



(The resistor between the two earth lines in the patch is for compatibility with true differential mike inputs. The 100 ohm 'load' resistor is probably not required.)

4) A moot point. The DIN standard does define signal directions for the connector in stereo, balanced and mono modes, although function of a given pin as input or output depends on whether the device is an amplifier or recording equipment. Confusion regarding this leads to ready availability of interconnection cords with both 'straight' and 'reversed' connections. At least some of these, if chosen correctly, will be immediately useful in the minimum Raynet plan and others can be conveniently 'cannibalised' to produce 'rig-adaptors'. Also, using an appropriate ready-made lead, a tape recorder COULD be plugged directly into the paralled socket of the 'line', notwithstanding lack of conformity with the 'true' DIN standard. By comparison, very few ready-mades can be adapted to the Sydney convention!

In summary, then I am suggesting a natural extension of the Raynet convention as published, and remain sure that it offers significant advantages over, and greater versatility than the current Sydney convention, and is worth 'pushing'. A few further observations on the article and on conventions:

1) Four-core cable, RS catalogue 367-577 is equivalent to Dick Smith W-2038. I can't find a catalogue equivalent from Tandy. Radio Spares has branches in Perth and Sydney.

2) A common convention for 12V supply uses 2-pin polarised Extra-Low-Voltage plugs (Clipsal 495) and sockets with a 'T' orientation of the pins. Unfortunately, while common sense suggests that the vertical of the 'T' be the ground for conformity with the standard for 240V mains fittings, some renegades opt for the opposite. These connectors are an obvious, very rugged, choice.

3) I personally, along with many others use 6.5mm phone plugs for 12V connections as a matter of compactness and cheapness. The plastic fittings are not very rugged, however, while the cheaper line sockets short during insertion etc, and there is some danger of confusion with common audio appliances. Alternately, Telecom and military disposals plugs and jacks are EXTREMELY rugged.

4) A compact connector for a 12V supply is the 2-pin, 'arrow' profile Utilux connector set (Tandy 274-222) used to some extent by Sydney WICEN, as well as some CB sets. This fitting is adequately rated and convenient, but probably has a limited repetitive connect-disconnect life.

Perhaps you may discuss such standards for 12V power supply in a future column in AR? In any case I will hope to see to what extent the Raynet convention is adopted by the regional WICEN groups, as I feel that a widely accepted convention is of tremendous value.

73,

Paul B. Webster VK2BZC

AR

MICROS PRODUCE THE COMPUTER-LITERATE GENERATION

By the time the current generation of school children and students complete their education, Britain will be the only country with an entire generation literate and versed in computers and computer technology.

Every single one of the country's 10.6 million pupils and every one of the 0.5 million students have access to a computer at some stage during their education — and mostly on a daily basis.

Due to the government's far-sighted programme "Micros in Primary Schools", launched a couple of years ago, 18,000 primary schools have been able to buy microcomputers for their classrooms. Higher up the age groups, 5,800 secondary schools have computers as do 868 polytechnics and 45 universities.

As if these figures are not impressive enough, Britain has the highest number of computers in the home in the world. An astonishing 2.7 million homes — 12 per cent of the total — own their own computer. Allowing an average of three people per home, this means more than one-third of the entire population uses and understands microcomputers.

from Information Technology from Britain 25.10.84

AR

LISTENING AROUND

Joe Baker, VK2BJX
Box 2121, Mildura, Vic 3500

Imagine yourself, as I was, an army switchboard operator on duty at Pine Creek in the Northern Territory, when suddenly the shutter signalling a call from the local area office drops, and an official voice asks *"We have a message for Sig Baker. Is he available?"* Of course, I was available and speaking. *"What is the message?"* I asked.

"You are to present yourself at the area office at 10 am tomorrow morning, escorted by two corporals with sidearms, before Area Commander Captain Pickett. This is an order, ***do not fail to obey it."***

When I recovered my composure, I dared to ask the caller what the matter was all about. *"You will be informed when you present yourself. Just make sure of your presence,"* the caller said before hanging up.

The following morning, equipped with sidearms, and dressed in full regulation uniform, with one corporal in front, and the other at the rear, I was marched across the railway line at Pine Creek to the area office and there paraded before the august presence of the Area Commander. I hadn't a clue as to what I had done wrong, but it was evident that it must have been something very serious.

After throwing the usual ceremonial salute, and identifying myself, he produced a long envelope and asked if I had sent that envelope and its contents to the Australian Broadcasting Commission. I took one glance at the envelope, and said yes, that I had written that story and posted it to the ABC some days before. It was one of several stories that I had written about the Northern Territory, and I think this one concerned an Army race meeting (the army's version of a NT Melbourne Cup).

He then began to read the charge, which was in effect that I had by so doing **broken the National Security Regulations — which was about as serious a charge as one could be guilty of especially in wartime.** It appears that my story to the ABC had been intercepted by military police somewhere down south — probably in Adelaide, their interest having been sparked by the fact that the envelope bore no censors mark, and it was customary for all mail at that time to have to pass an official censor before it left the Northern Territory. He then asked me how I pleaded and I said *"Not Guilty, Sir."*

"May I remind you Signalman Baker that I am the official censor for this military area, and this piece of correspondence ***never came to me*** *for censoring. How did you manage to smuggle that envelope out of the Territory, was it by rail?"* he asked.

"I have no knowledge of how it got out of the Territory without being stamped by a censor," I replied. *"As you know sir, the railway line from Darwin finishes near Birdum, not Adelaide, and since you went on leave Sir, it has been the custom for signallers to send all outgoing mail to our own headquarters at Adelaide River (70 miles north of Pine Creek). All I know Sir, is that I put that piece of mail in the bag going to Adelaide River, and how it got down south without having been censored, I do not know."*

Captain Pickett admitted that this put a different complexion on things, and said that he would give me a remand of one week, so that he could check my story. That was the last I heard of the matter, for a short time later Captain Pickett was involved in a head-on collision between two military vehicles, in which both he and an RAAF driver lost their lives. I was on duty at the switchboard at Pine Creek when news of collision came through, and you will read about that later.

In the Northern Territory, when you are in at an isolated place like Pine Creek, facing long hours of boredom, all the days seem the same, and you resort to all sorts of rouses to pass the time. However I spent many an hour talking to other switchboard ops in other isolated areas. My particular mate was an operator at the army detention centre — a place called Brocks Creek, about 40 miles to the north of me. Known to all as "The Count" because of his classy voice, he had, I believe, before the war been a Yarra Bank orator, and he could rage on and on about Einstein's Theory of Relativity, the Cosmos and Religion for hours. He seemed to be a never-ending fund of knowledge, and utterly wasted operating his Pyramid switchboard at Brocks Creek. I don't think anyone ever won any argument in which he was involved.

I mention him not because of any particular incident or happening but just because he was a character in his own right. When, in the course of time, I was due to leave Pine Creek, I met him for the first time when he came to relieve me. He was as scrawny as they come — and came complete with about 100 or more books which were where he got his knowledge from.

Part of our communications system at Pine Creek included a pigeon loft containing about thirty birds and it was the job of one soldier to look after them.

At Pine Creek we also had a Cypher Clerk, who had been coached in the art of cyphering by a certain Lieutenant who used to visit Pine periodically for the purpose.

When he was visiting, he was closeted with the soldier he was training in a special room which was out of bounds to the rest of us. Knowing nothing about cypher work, I don't know what happened in that room, but it was all so very, very secret.

Although we didn't have any radio transmitters at Pine, at this time, the army did have what was called the "substitution code". It was a means by which if one radio operator became suspicious that "the enemy" might be listening, a word such as "apple" could mean that such and such a unit was moving, and hopefully the enemy wouldn't have a clue as to what "apple" meant. However it was a much more involved code than that and there was a system by which, taking into consideration the time and day of the month on which contact was being made, one operator could challenge the identity of another. All this was on the top secret list of course and in wartime what is known as "operators chat" was not permitted. Operators were also discouraged from having particular mannerisms of speech, for example if one operator had the habit of making a slight cough while using Radio Telephony and his unit moved to another area, the listening enemy could be sure that his whole unit had moved.

However, operators using sounders on the Overland Telegraph line were free from such restrictions. One operator that we had at Pine Creek used to crack jokes and another operator somewhere down south used to obtain the most up-to-date racing information and for a price, such news sheets were distributed to soldiers with racing interests all over the Northern Territory. "The Whispering Wire" as Mrs Anaeas Gunn called the Overland Telegraph line, had found a new use in World War Two.

This is not yet the full story of my army days in the Northern Territory, but for now the best of 73s from

Joe VK2BJX
AR

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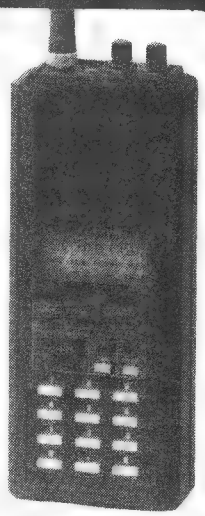

The Microcomm SX-150 represents the latest developments in State-of-the-art LSI CMOS technology as applied to scanning monitor receivers. It incorporates many features, a lot of which are not even found in today's larger base scanners
For example the SX-150 has 160 memory channels which can be programmed in either of two modes. The first allows you to manually program the entire 160 channels. The second mode provides for manual programming of the first 40 channels with the top 120 reserved for use by the SX-150 while in its SEARCH mode. It uses these channels to automatically store frequencies on which it has found signals during the search phase.
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Supplied complete with rechargeable Nicad batteries, charger, and rubber duck antenna, the SX-150 is a must for anybody with an interest in monitoring

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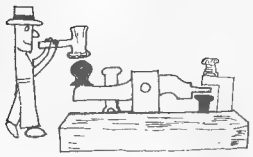


POUNDING BRASS

Marshall Emm, VK5FN
GPO Box 389, Adelaide, SA 5001

Whither CW?

During the brief history of amateur radio there have been occasions where a physical mode of operation has given way to something newer and better, just as the dinosaurs vanished when they were no longer suited to their environment (or vice versa). Spark gave way to CW, and AM gave way to SSB. Nobody has yet suggested that SSB should give way to FM, but scarcely an amateur magazine appears in print without someone suggesting that CW is a dinosaur that should have died out years ago, when microphones and code-free (technician) licenses were invented.

When spark and AM bit the dust, it was for a very good reason — amateurs as a group benefited from the transition to more efficient modes which made more effective use of the available spectrum. If spark and AM were still the going thing, there would be room for far fewer operators on any given band at any given time. But why be-labour this — very few operators would seriously argue that the status quo should be changed at this late date.

Even during the transition from spark to CW there were those who predicted an end to the hobby as a result. Spark was the mode they knew, and it was the only mode they wanted — at least till it was proved incontrovertably that CW was far more effective with far less power.

And of course AM is still alive and well — on 160m and wherever some budding 21st century Marconi has built himself an AM transmitter out of old TV parts.

The point is simply this — operating modes are very very difficult to kill — it takes a combination of superior technology and legislation, and even then there will be objectors. So to that limited extent, the future of CW seems reasonably assured, but those are surely very negative reasons for its retention.

What sort of superior technology will replace the human ear? CW can almost always out-perform any other amateur mode when conditions are poor, simply because the ear is more discriminating than any machine, and CW relies on the detection of the presence or absence of a tone (not it's pitch, or pronunciation, or any other form of modulation). Add to that the advantages that it is technologically simple, efficient, and inexpensive, that standard messages can be communicated between operators who cannot pronounce each other's languages, and you have a very attractive proposition — which is why there are so many enthusiastic users of the mode today. It is also the reason so much continuing technical effort is devoted to such operating conveniences as keyers and filters.

To some extent it is probably fair to say that CW operators belong to a traditional hard-core of amateurs whose primary interest is in communicating with other amateurs. This is where it gets a bit risky. The legal aspects of the hobby are always controlled by non-amateurs, who rely on amateur organisations for guidance. These organisations tend to be dominated these days by people who are more interested in current events (so to speak) and their own particular areas of interest. This means that the hobby as a whole can be controlled by people who have no particular interest in CW, and who may never even have used a key.

Don't think for one minute that we are not extremely fortunate to have our exclusive usage segments — they have come under attack before, and undoubtedly will again. Each time there are more trendy techniques around, and CW is that little bit older and more "antique" so it seems to many that our privilege is too great.

CW as a mode needs a higher profile if it is to survive into the next century. Every CW operator should make a point of working the slow newcomer occasionally, and of encouraging (on SSB, at WIA meetings, in the local press) as vocally as possible our non-vocal mode. Write a letter to the Editor of AR supporting the mode and retention of the Morse exam as a requirement for licensing. *Make Yourself Heard.*

Here endeth the reading . . . And on to signal reporting, as promised.

In CW operation, the standard report format is called the "RST Report," a three digit number representing an appraisal of Readability (R), Strength (S), and Tone (T), in that order.

READABILITY

Reported on a scale of 1 to 5, where 1 represents no readability and 5 equals perfect copy. Assuming that "copy" is our ability to derive intelligence from a received signal, perfect copy would represent 100 per cent reception with no difficulty. For the record, the scale is:

1 No readability
2 Barely readable (only occasional words)
3 Readable with difficulty
4 Readable with practically no difficulty
5 Perfectly readable

The word "difficulty" as used above presents some problems. Keeping in mind that we are talking about actual signals here, you should ignore "difficulty" that you might experience due to your own copying ability or the other station's sending speed.

Note that there is no provision for a report of Readability 0-R1 means no readability, and you can't get any lower than none!

STRENGTH

Reported on a scale of 1 to 9, where 1 represents faint signals and 9 represents extremely strong ones:

1 Faint, barely perceptible
2 Very weak
3 Weak
4 Fair
5 Fairly good
6 Good
7 Moderately strong
8 Strong
9 Extremely strong

A great degree of judgement is called for in giving a strength report. "S-points" cannot be measured objectively outside a laboratory, so meter deflection should be taken as a relative indication only. For example, my own S-meter is sluggish on 10 metres — if it twitches the received signal must be at least S8! As far as possible, give a report which indicates the strength relative to other signals on the band. It may seem strange to give an S9 report when the static noise level is S9+3dB, but there is scope in the report amplifications to explain that one, as we shall see next month.

Never, never, never give a report of S0. It just makes you look silly, because if there is no signal strength at all, there is no signal — and nothing for you to report on in the first place.

For practical purposes, readability can give a clue to the appropriate strength report, at least to this extent — if the Readability is 5, Strength can't be less than 3. Look at the tables and think about it.

TONE

Yes, tone . . . Well, what can we say about tone? This report goes right back to the days of spark. T1 is defined as a rough, hissing note, while T9 is defined as a pure DC note with no trace of ripple. I think in technical terms a report of less than T9 would have to represent some form of modulation, but you don't often hear it.

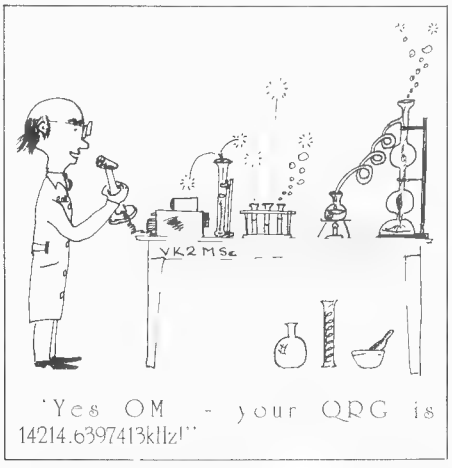
NOTE: *Technical faults such as Chirp, Drift and Clicks do not mean sub-standard tone. They will be covered separately next month.*

I once got a report of 5/9/8 and I was so shocked I nearly broke the paddles going back with *"WHY T8? WHY T8?"* The answer I got was *"SRI OM RCVR HR NOT VY GUD."* He knew the fault was in his receiver, but he still wouldn't change my report. Oh, well . . .

Till next month — may all your reports be 5/9/9.

AR

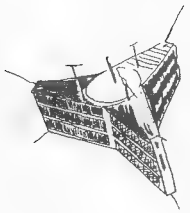
"5/9?—5/9? — Listen Mac, that's not good enough!"



"Yes OM - your QRG is 14214.639741 3kHz!"

"...I don't care if you've got a 50 element monobander - you're still 5 and 2 ..."

Cartoons by Bill Martin VK2EBM



AMSAT AUSTRALIA

Colin Hurst VK5HI
8 Arndell Road, Salisbury Park, SA 5109

NATIONAL CO-ORDINATOR

Graham Ratcliff VK5AGR

INFORMATION NETS

AMSAT AUSTRALIA
Control: VK5AGR
Amateur Checkin: 0945 UTC Sunday
Bulletin Commences: 1000 UTC
Winter: 3.680 MHz Summer; 7.064 MHz
AMSAT PACIFIC
Control: JA1ANG
1100 UTC Sunday
14.305 MHz
AMSAT SW PACIFIC
Control: W6CG
2200 UTC Saturday
21.280/28.878 MHz

Participating stations and listeners are able to obtain basic orbital data including Keplerian elements from the AMSAT Australia net. This information is also included in some WIA Divisional Broadcasts.

ACKNOWLEDGEMENTS

Contributions this month are from Bob VK3ZBB and Graham VK5AGR

UPS AND DOWNS.

Once again from Bob Arnold VK3ZBB we have the latest list of Launches and Re-entries of man-made objects. We are deeply indebted to Bob for his contributions each month.

AMSAT GENERAL MEETING

Graham VK5AGR and Peter VK7PF were attendees at the AMSAT Annual General Meeting held on the weekend 10th and 11th November 1984, at Los Angeles. Following the AMSAT AGM Graham and Peter were Planning to visit the University of Surrey, AMSAT-DL at Marburg and the Budapest University to ascertain the latest developments in the Amateur Satellite Service. We look forward to a detailed report in a future issue of Amateur Radio.

W3IWI COMPUTER PROGRAMME

Many readers will have a copy or variant of the Tom Clark Orbits Programme that utilises the Keplerian Element set. As users will be aware you do require a CURRENT YEAR set of Keplerian Elements. However they do take a few days into the New Year to filter through from the United States. Therefore until you get a 1985 Element Set for your favourite satellites here is an operating hint to help you through and overcome the "Elements not from current year" Error.

If you wish to run the Programme using the 1984 Set on the 1st January 1985 insert the Date into the Programme as 32nd December 1984, similarly the 2nd January becomes 33rd December 1984.

PHASE 4 PROGRAMME

The following excerpts are from a paper prepared by Jan King W3GEY, AMSAT Vice-President, Engineering. It details a concept for the next generation of satellites. It is purely a discussion paper to gauge reactions from the worldwide Amateur Satellite Service. Any comments that you wish to make following a read of these excerpts would be greatly appreciated. Comments to Graham VK5AGR. The complete paper has link calculations and substantial technical discussion and derivation. Any person wishing to peruse the complete paper can obtain one by sending a request to Graham VK5AGR, QTHR and include $1 for Pack and Post.

AMSAT PHASE-4 CONCEPT

by Jan A King

INTRODUCTION: The following concept has occurred to me over the course of the past several months during the preparation of AMSAT's long range planning document. I believe the concept put forward here is, in fact, very ambitious and could be done only if an extreme commitment could be made by all international parties both in the area of financial contributions and in technical effort on the satellites and ground stations. I also believe that the effort would result in a mission that could change amateur radio in a major positive way. It must also be stated that this approach is the most ambitious concept of a family of such possibilities. I hope the ideas expressed here will be taken as constructive to the overall international programme; whether they ever evolve into a mission is entirely dependent on the people who must do the work. The concept must be traded against various national and international priorities.

MOTIVATION: The motivations of this concept result from my collective experience in over 15 years of work with the amateur satellite programme. The past two years, however, have been most formative. The following specific facts or impressions are most important:

1 The best communications capability for the amateur satellite service has not as yet been achieved. 24 hour per day service on a global basis has not yet been achieved. The successful launch of Phase 3-C will not accomplish this objective even if AO-10 lasts for another 5 to 6 years.

2 Different amateur satellite groups have different expectations as to how the amateur satellites should be used and operated. These differences should be accommodated and it is the right of each group to expect that the satellites be operated in accordance with their wishes.

3 No clear preference exists within any one satellite group (let alone among all of the groups together) as to the best mode of satellite transponder operation.

4 Satellite system complexity for high earth orbiting missions suggests that satellite construction groups work together internationally in order to accomplish goals that could not be reached by any group working by itself.

5 Unavoidably, but regrettably, the Ariane L-6 mission Sylda which contained P-3B was virtually empty. As an on site observer, knowing the value of such a vast mass margin, gazing into Sylda was nearly enough to make a grown man cry! At the same time I realize the level of effort required to achieve the completion of the P-3B project.

6 The Ariane-4 opportunity available to us will have an even larger wasted mass margin if we fly only a Phase-3C spacecraft in our proposed payload position.

7 The launch of a single synchronous satellite for the amateur service is simply unfair and would strain the relationships of the international satellite community.

8 The launch of multiple payloads on a single mission allows for cleaner segmentation of work while allowing for the advantages of a common design. Mass production and larger parts procurements provide cost savings due to economy of scale. This approach allows for participation on a single focused mission on a truly international scale.

9 Both the UOSAT and PHASE-3 programmes have demonstrated shortcomings in pre-launch planning for mission operations. This situation must be rectified if an international programme is to survive.

10 In the US where funds cannot be realistically raised via government sources and no University "umbrella" has been found to foster the programme, it is clear that powerful fund raising techniques must be used in order to raise the level of funding necessary to support each project. It will be more difficult to raise funds for a repeat mission than to raise money for an exciting new programme.

11 Discussions with Ariane planners have suggested that lower cost missions might always be available on Ariane provided that additive costs for the missions can be found and that the satellites themselves are within a load carrying structure for the primary satellite (P-3C case) or become the load carrying structure for a primary satellite (eg: Apple, Viking/Sweden).

12 It has been the goal for some years among members of the Phase-3 team to find a method of co-operation with amateurs of the USSR on an amateur space project.

MISSION CONCEPT: The proposed mission would effectively use the Ariane-4 mission (or a later launch) volume to place a constellation of six (yes, 6) satellites into geostationary orbit. The spacecraft would be transferred into geostationary orbit by a common "carrier" and would be ferried through the drift phase of the mission and would then be deposited, two at a time, into each of three geostationary orbit positions by the carrier. The mission would rely heavily upon Phase-3 technology. The six "subsatellites" are fitted into a seven topology hexagonal pattern and released much as with the FIREWHEEL mission planned by MPE. Fabrication of subelements of the satellites are accomplished by "groups" internationally. A group is the collection of workers within any country or geographic area who agree to co-operate as a single entity. It could also be two countries working together. One group, for example, the Technical University of Budapest, might build six BCR units. Once all of the hardware subassemblies had been completed, each of six groups would then integrate a subsatellite from the kit of equipment provided by the groups collectively during the first phase of the programme. A key feature of this proposal is that each satellite would carry one transponder agreed upon (by all) as the "international standard" — in the proposal I am suggesting mode-L — and one or more "experiment(s)" of the choosing of each group. The special experiment is to be of the group's own choosing and may not be influenced by the other groups so long as the performance of the internationally agreed transponder is not compromised. Once the satellite is "on-station" the operation of the satellite is the responsibility of the integrating group, however, it is strongly recommended that the team that physically built the satellite be separate from the team (within each group) that will operate the satellite.

APPROACH TO INTEGRATION GROUP PARTICIPATION:

APPROACH #1:
S/C #1: AMSAT-UK/UOS/SA AMSAT
S/C #2: AMSAT-DL
S/C #3: AMSAT-US/AMSAT-CANADA
S/C #4: JAMSAT/AMSAT-NZ/WIA
S/C #5: TECH UNIV BUDAPEST/DOSAAF-USSR
S/C #6: RACE-FRANCE
CARRIER: UNIVERSITY OF SURREY
POSSIBLE ADDITIONAL HELP: AMSAT-NL, AMSAT-SW, PACKET GROUP, SWEDEN

APPROACH #2:
S/C #1: RACE/FRANCE
S/C #2: AMSAT-DL
S/C #3: AMSAT-US
S/C #4: AMSAT-CANADA/SA AMSAT
S/C #5: JAMSAT
S/C #6: TECH UNIV BUDAPEST/DOSAAF-USSR
CARRIER: UNIVERSITY OF SURREY/AMSAT UK. The carrier could become a scientific platform carrying a variety of experiments.
POSSIBLE ADDITIONAL HELP: As above

APPROACH #3:
S/C #1: AMSAT-DL/TECH UNIV BUDAPEST
S/C #2: AMSAT-DL/TECH UNIV BUDAPEST
S/C #3: AMSAT-US/AMSAT CANADA
S/C #4: AMSAT-US/AMSAT CANADA
S/C #5: AMSAT UK/UOS
S/C #6: SA AMSAT/AMSAT NZ/WIA
CARRIER: UNIVERSITY OF SURREY
POSSIBLE ADDITIONAL HELP: JAMSAT, RACE

PROPOSED SUPPORT PROVIDED BY GROUPS TOWARD THE COMMON PROJECT:

Integration (Assembly of Carrier and installation of subsatellites): University of Surrey
Structures for Subsatellites: AMSAT-US/AMSAT-DL
Carrier Module: Structure: University of Surrey. Propulsion: AMSAT-DL/MBB. Solar Arrays: AEG Telefunken or Solarex.
Sensors: AMSAT-DL
Reaction Control System Components: AMSAT-US
Batteries: GE/USA and/or Saft/France
BCR's (X2 Power Capability): Technical University of Budapest
Assembly of Battery Packs, IHU's, SEU's, LIU, Nutation Dampers, Antennas, Thermal Components, and other system small units could be shared among the groups participating.
Transponders: One of the problem areas. Clearly AMSAT-DL cannot build 6 Mode-L transponders on their own. A method must be found for sharing and "productionizing" this work.
Special Experiment (Transponder): The responsibility of each participating group to build or obtain their own special experiment(s).

USABLE PHASE-3 TECHNOLOGY:

Integrated Housekeeping Unit
Battery Charge Regulator (X2 increase in output capability, must be added).
Senesor Electronics Unit (See notes later in presentation).
Liquid Motor Ignition Unit (One unit on Carrier Mudule).
400 N Motor
Propellant Flow Assembly
Battery Packaging Technology
Sensors (Earth and Sun)
Nutation Dampers
Mode B Transponder (For those interested in using this as their special experiment).
Telemetry and Command Standards

NEW REQUIRED TECHNOLOGIES:

Mechanically Despun Antenna or Platform
MDA Drive Electronics
Reaction Control System
RCS Electronics
Mode-L Transponder/Antennas
Subsatellite Separation System
Synchronous Orbit Ranging and Orbit Determination System

POSSIBLE SPECIAL EXPERIMENTS:

Packet or Digital Communications Experiment/ Transponder
Mode B or Mode J Transponder
Microwave Transponder
Satellite-to-Satellite Communications Experiment
Synchronous (High B-Shell) Magnetometer; Partical or Radiation Detectors.
Data Storage/Mailbox/Advanced Beacon Experiments/Voice Synthesizer.
Mode-A Transponder (USSR?)

PROPOSED ORGANIZATIONAL ARRANGEMENT:

1 Each subsatellite will carry one 500 kHz Mode-L Transponder in support of the international satellite system.

2 Each subsatellite may carry one or more experiments that are of a regional nature defined by the group integrating that satellite. Experiment mass and power may not exceed established limits and the experiment may not interfere with the Mode-L transponder. Time sharing of experiments is addressed below.

3 Project has a single design authority — K Meinzer.

4 This authority includes the design of the subsatellites and the propulsion system of the Carrier Module.

5 This design authority does not include the specific design of the Carrier Module.

6 This design authority does not include the design of the ground control network.

7 A design review committee will meet periodically to review the overall project design. One design review member will be appointed from each group.

8 Each group will integrate one or more subsatellite(s).

9 Subsystems will be fabricated to AMSAT-DL specifications but, built by various groups according to their interests, abilities and expertise.

10 Piece parts are provided by various groups according to the best price and quality of equipment.

11 Each subsatellite will operate Mode-L and meet the standards of the international system. Mode-L will operate a minimum of 75% of the time per day. The special experiments can operate up to 25% of the time per day (or longer if they do not interfere with Mode-L and they do not exceed their power allocation of approximately 20 W).

12 The Mode-L OFF time must not occur simultaneously for two satellites at a common geostationary slot.

13 All subsatellites must have absolutely common external interfaces. The addition of special experiments cannot violate these interfaces.

14 The ground control network is managed separately in a team arrangement. This team acts in parallel with the spacecraft team. The ground control network is made up of members from each group.

15 Once the subsatellites are on station, each is maintained by its own organization (group). Backup arrangements can be made on a case by case basis.

16 University of Surrey/AMSAT-UK will act as the system integrator.

17 AMSAT-DL will act as single point of contact with the launcher authority.

18 An MOU is signed by all participating groups in advance of signature of the ESA contract.

19 Final ESA contract signed by K Meinzer but with counter signatures (of responsibility) by each group. The intent is not to cause AMSAT-DL to be responsible for any financial burden should problems arise.

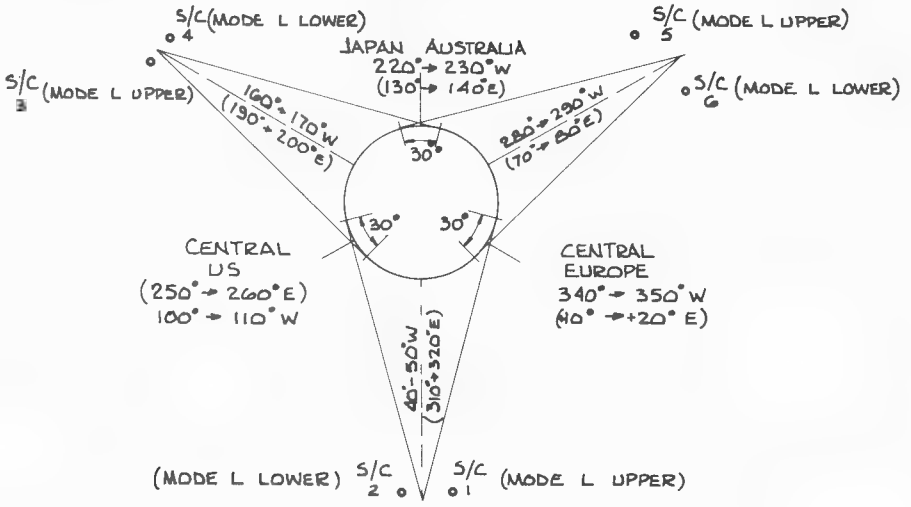
20 Metric standards will be applied for the project design. (Screws, nuts and bolts could be an exception.)

21 A fund raising quota system could be proposed for each group. Each group is not necessarily responsible for raising 1/6th of the total funding. Larger groups would be expected to pick up a larger percentage of the cost burden.

22 IARU, Regions 1, 2, 3 to support shipping, transport and travel costs (as a minimum).

23 Larger groups like IARU, ARRL, JARL, RSGB, DARC should get very excited about this kind of a system. They should be more prepared to pay.

de Colin VK5HI
AR



PROPOSED ORBIT POSITIONS

- Each S/C can view ±75° of longitude at 55°N latitude or 150° total longitude
- 3 S/C, equally spaced can see 450° (@55°N latitude or 55°S latitude)

∴ 3 S/C have 90° of overlap at 55°N or S or 3 zones of overlap each 30° wide.

NOT TO SCALE

- Major population zones can view 4 spacecraft and have access to 4 transponders totalling 2 MHz of bandwidth.

NEW ENDORSEMENTS FOR WAC

The Administrative Council has created two new endorsements for the Worked-All-Continents award: FAX and QRP.

Amateurs who have achieved two-way facsimile (A3C, F3C or J3C) communication with all six continents may request FAX-endorsed WAC certificates. In honour of the pioneers in this mode who may be now engaged in other activities, contacts of any date, past or future, are valid. FAX certificates will *not* be numbered, consistent with the practice for SSB, SSTV and RTTY certificates.

QRP endorsement will be available from 1985. The endorsement will be in the form of a sticker for affixing to a basic (CW or mixed-mode), SSB, SSTV, RTTY, FAX or 5 band certificate. QRP is defined as 5 watts output (10 watts input) or less. Only contacts made *on or after 1 January 1985* will be valid. The applicant must make the six contacts while running QRP; there is no restriction on the power of the stations contacted.

The other endorsement stickers that are presently available are for 1.8 MHz, 3.5 MHz, 50 MHz, 144 MHz, 432 MHz and 6-band operation. Please be also reminded that contacts made on 10, 18 or 24 MHz are *not* good for 5-band or 6-band WAC at present.

from Region 1 News — Oct '84
AR

ANDORRA EXPEDITION

The Worcester Moonbounce Society (UK) has announced that its 1985 DXpedition will be to Andorra. Callsigns will be C30AKA, C30BTA and C30CMV. Activity will be on all bands from 1.8MHz to 1.3GHz, including 50MHz. Skeds can be arranged by writing to G6JNS, QTHR. The dates will be from 15 to 22 April, and the QSL manager will be G6JNS, PO Box 36, Worcester.

from Rad Com — Nov '84
AR

OSCAR-10 APOGEES

JAN/FEB 1985

DATE	DAY #	ORBIT #	APOGEE UTC HHMM:SS	SATELLITE CO-ORDINATES LAT DEG	SATELLITE CO-ORDINATES LONG DEG	BEAM HEADINGS SYDNEY AZ DEG	SYDNEY EL DEG	ADELAIDE AZ DEG	ADELAIDE EL DEG	PERTH AZ DEG	PERTH EL DEG
JAN 1	1	1168	0354:48	10	201	11	38	27	34	52	23
2	2	1170	0313:53	10	191	24	36	38	29	59	16
3	3	1172	0232:58	10	182	35	32	47	24	66	9
4	4	1174	0152 04	10	173	45	26	55	17	71	1
5	5	1176	0112:36	10	164	53	21	62	11		
6	6	1178	0031:41	10	154	60	14	69	4		
6	6	1180	2350 46	10	145	67	7				
7	7	1181	1130·18	10	320					286	-2
8	8	1183	1049·23	9	311					291	5
9	9	1185	1008.28	9	301					297	13
10	10	1187	0927 33	9	292			289	1	304	20
11	11	1189	0846:38	9	283	287	1	295	9	311	27
12	12	1191	0005·44	9	273	292	7	301	16	321	33
13	13	1193	0724·49	9	264	299	14	309	22	332	38
14	14	1195	0643 54	9	255	306	21	318	29	344	41
15	15	1197	0602 59	9	245	314	27	328	34	358	43
16	16	1199	0522 05	9	236	324	33	339	38	12	42
17	17	1201	0441:07	9	227	335	37	352	40	25	39
18	18	1203	0400·12	8	217	348	40	6	40	37	35
19	19	1205	0320 45	8	208	1	41	19	38	47	30
20	20	1207	0239·50	8	199	15	40	31	35	55	23
21	21	1209	0158·55	8	189	27	37	41	30	62	16
22	22	1211	0118:00	8	180	38	33	51	24	69	8
23	23	1213	0037·05	8	171	48	27	58	18	74	1
23	23	1215	2356:11	8	161	56	21	65	11		
24	24	1217	2315.16	8	152	63	14	72	4		
25	25	1219	2234·21	8	143	70	6				
26	26	1220	1013·52	7	318					285	1
27	27	1222	0932.58	7	309					290	8
28	28	1224	0852.03	7	299					296	16
29	29	1226	0811·08	7	290			288	4	303	23
30	30	1228	0730:13	7	281	286	2	294	12	312	30
31	31	1230	0649 18	7	271	292	10	301	19	321	36
FEB 1	32	1232	0609.51	7	262	298	17	309	26	333	41
2	33	1234	0528.56	7	253	306	24	318	32	346	44
3	34	1236	0448.01	7	244	314	30	329	37	1	45
4	35	1238	0407·06	6	234	324	36	341	40	16	44
5	36	1240	0326.11	6	225	336	40	355	42	29	41
6	37	1242	0245·14	6	216	350	43	9	42	41	36
7	38	1244	0204:19	6	206	4	44	22	40	50	30
8	39	1246	0123 24	6	197	18	42	35	36	59	23
9	40	1248	0042 30	6	188	31	39	45	31	66	16
10	41	1250	0001·35	6	178	42	34	54	25	72	8
10	41	1252	2320 40	6	169	52	28	62	18	77	1
11	42	1254	2241:12	5	160	60	21	68	11		
12	43	1256	2200 18	5	150	67	14	75	3		
13	44	1258	2119.23	5	141	73	6				
14	45	1259	0858 54	5	316					284	3

SATELLITE ACTIVITY
FOR PERIOD 24 AUGUST TO 21 SEPTEMBER 1984

NUMBER	NAME	NATION	DATE OF LAUNCH	PERIOD MINS	INITIAL DATA APOGEE KM	INITIAL DATA PERIGEE KM	INCLN DEG	REMARKS
1984-09 1A	USA-4	USA	Aug 28	-	-	-	-	Military
1984-092A	Cosmos 1591	USSR	Aug 30	89 4	300	220	82 3	SI TM
1984-093A	STS 41D	USA	Aug 30	90 6	314	297	28 5	**
1984-093B	SBS-4	USA	Aug 30	640 2	36137	317	23 0	# †
1984-093C	Syncom IV-2	USA	Aug 31	1433 6	35784	35692	3 5	#
1984-093D	Telstar 3C	USA	Sep 1	1430 3	36573	34776	0 4	#
1984-094A	Cosmos 1592	USSR	Sep 4	90 0	380	209	72 9	SI TM
1984-095A	Cosmos 1593	USSR	Sep 4	676	19141	-	64 7	SI
1984-095B	Cosmos 1594	USSR	Sep 4	676	19141		64 7	SI
1984-095C	Cosmos 1595	USSR	Sep 4	676	19141	-	64.7	SI
1984-096A	Cosmos 1596	USSR	Sep 7	709	39342	613	62 8	SI TM
1984-097A	USA-5	USA	Sep 8		-	-	-	Military
1984-098A	PRC-16	China	Sep 12		-	-	-	
1984-099A	Cosmos 1597	USSR	Sep 13	89 1	272	219	82 3	SI TM
1984-100A	Cosmos 1598	USSR	Sep 13	-			-	
1984-101A	Galaxy-C	USA	Sep 21	664 2	36980	697	21.3	Geosync

SI — Scientific Instruments. TM — Telemetry
*** — Carrying Astronauts H Hartsfield, M. Coats, R Mullane, C Walker, S Hawley, and J Resnik*
 # — Launched from STS-41D
† — Designed to provide digital communication for government, industry etc

The following Satellites returned or decayed during the period —

1984-066A	Cosmos 1576	Aug 24
1984-077A	Cosmos 1585	Sep 28
1984-082A	Cosmos 1587	Aug 31
1984-086A	Progress 23	Aug 28
1984-087A	Cosmos 1590	Aug 30
1984-092A	Cosmos 1591	Sep 13
1984-093A	STS-41D	Sep 5
1984-098A	PRC-16	Sep 29
1984-099A	Cosmos 1597	Sep 26

Together with 40 other objects.

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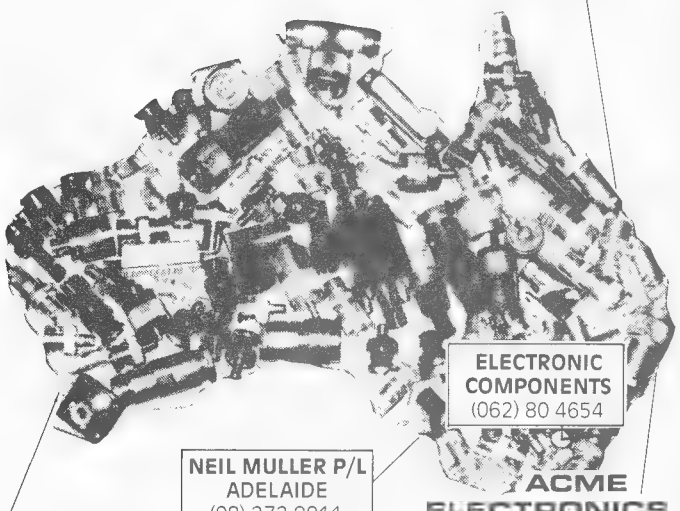

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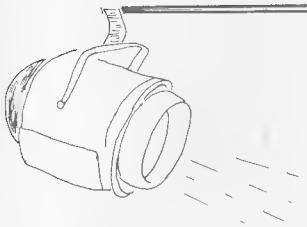

SPOTLIGHT ON SWLing

Robin Harwood, VK7RH
5 Helen Street, Launceston, Tas 7250

Welcome to 1985! I sincerely do hope that this year will bring health and happiness to you and your family. I am also hoping that you will continue getting DX, although propagation will still be unpredictable, especially on the higher frequencies.

NEW 22 m BROADCASTING

At the time I am compiling this column, there have been several interesting developments. You may remember that in 1979, the WARC meeting, allocated a new international HF broadcasting band between 13.600 and 13.800 MHz. Operations on these new frequencies were expected to be commencing in about 1988, after existing users of the spectrum had been re-located on other frequencies. Now the Soviet Union has commenced utilizing the new 22 metre broadcasting allocation in a big way, as from the 1st October 1984. I have observed lately several strong signals, broadcasting Soviet Domestic and Foreign Service programming. Transmissions appear primarily directed to the Middle East, Africa and West Asia, indicative of the senders being located in Kazakhstan and/or Uzbekistan.

For example, on 13.600 MHz, I am hearing a domestic regional programme in the local evening hours in Russian. On 13.645 MHz, Radio Moscow is heard with foreign service programming in Asian/Middle Eastern languages and dialects, e.g. Punjabi at 1130 UTC was observed.

Transmissions also are beamed to Africa in various local languages on 13.625 MHz between 1500 and 2100 UTC as well as English/French and Portuguese. World Service and African Service programming in English have been heard between 1500 and 2100, with a transmission in Hausa at 1800, sandwiched in between. This presumably is being beamed to West Africa. 13.660 MHz has been noted with French (Radio Moscou Internationale) from 1700 UTC, with Arabic from 2100 to 2130 UTC. The World Service is reported on 13.680 MHz from 1400 to 1700 UTC followed by African languages until 2000, when English is observed. I have noted Indonesian in the past on 13.790 MHz from Moscow, but presumably other languages will also be utilized as the need arises.

This new 22 metre allocation has also been used by several other nations ahead of time. South Korea has been noted with test transmissions on 13.665 MHz between 0630 and 0830 UTC with identification announcements in various languages. The Gulf War between Iran and Iraq has also seen the 22 metre allocation used by both sides. Baghdad has been noted in Arabic between 11-12 and 20-21 hours on 13.700 MHz while Tehran has been noted on 13.745 MHz broadcasting in Farsi from 0330 till 1130 UTC in parallel with 9.022 and 15.084. Jerusalem has been using the new allocation for some time now, and programming in Russian as well as a relay of the commercial H/S in Hebrew has been on 13.720 MHz, accompanied by heavy jamming. Iceland has been heard by several on 13.797 MHz with a relay of the domestic MW programmes, yet I consider this to be a Utility Feeder as it is on SSB.

Now that the new allocation has come alive with activity, I shall not be surprised to see it fill up very rapidly with other broadcasters during the year. Concurrently with the expansion on 13 MHz, other allocations have also spread outside the allotted bands, particularly the 16 and 31 metre segments. My thanks to Bob Padula of the ARDXC News for most of the above information.

BBC WORLD SERVICE

Also as I am writing this up, the news from the Indian sub-continent is dominating the World News, following the assassination of Mrs Indira Gandhi, the Indian Prime Minister. I was alerted by a headline over the local TV channel, and commenced monitoring one of the international newsagency feeds on RTTY for the next few hours. Strangely enough, I had poor propagation from India, that night. So I mainly relied on the BBC World Service for the latest news.

And while I think of the BBC, now aided by the R70 receiver, I am now able to almost get a continuous coverage of "Bush House". These are via the various relay bases, as there are, in fact, times when UK sites are inaudible, when propagation should be reliable. I often had to rely on the Antigua relay in the Caribbean, but alas, a station has appeared alongside, causing a nasty heterodyne from 0700 UTC. The station is on 9.509 MHz variable, and aided with the notch and passband tuning controls, I was able to positively identify it as Algeria in French. It has been notorious for its frequency instability.

MODERN TECHNOLOGY TAKES OVER

The Radio Australia facility at Lyndhurst is to be closed. This is according to Robert Jones, in the November edition of the ADXN Station News. Already the RA feeder on 12.290 MHz USB has been discontinued as from the 20th September 1984, although it will remain on standby, if required. The proposed AUSSAT communications satellite will be feeding audio to the various sites, backed up by terrestrial microwave links in the future. Services at present stationed there, will be relocated to other sites, with the facility being closed later this year, or early 1986.

Well, that is all for this month. Until next time, the very best of DX and good listening! — Robin.

AR

BILL DESPAIRS

Ted Holmes VK3DEH 20 Edmunds Street, Parkdale, Vic 3195

Driving home from the supermarket, Bill Blitheringtwit felt mildly satisfied. Despite the fact that his brand new power supply was already looking a bit the worse for wear, at least he had a unit which would probably work. He could get back on air, anyway, after a few minor repairs had been done. He wondered where he put the masking tape. . . . Humming unmusically, he arrived back safely beneath his home carport.

Normally at this point his wife vanished indoors, leaving him to unload all the shopping. Today, however, she didn't. She hung around the car boot waiting for him to open it. This was awkward. If she spotted the battered (but plainly alien) carton containing the remnants of the power supply, nestling amongst the shopping, then he was a doomed man. Bill dawdled a bit, fiddled around, examined things in the car, but his wife never budged. Perhaps she had smelt a rat. Eventually he had to alight and he sidled around to the boot. He could see a distinct glint in his wife's eyes. Almost steely, he thought.

"Don't worry, dear," he said. "I can carry all this stuff in."

"I want to see," said his wife.

"See what?" Bill asked, all innocence.

"What you bought," she said.

"Bought?" echoed Bill, but it was no use. He realised immediately that he was a dead duck, a condemned man, doomed. Reluctantly, he opened the boot. There stood the carton, naked, blatant, made in Japan.

"Aha!" his wife exclaimed. "What's that?"

Bill cleared his throat. He knew what was coming.

"A power supply."

"A what?"

"A power supply. Real cheap too. Beat the chap down . . ." Bill rambled on, seeing a look of total disapproval forming on his wife's face.

"Indeed!" she said and then proceeded to give him a dressing down which lasted ten minutes.

As she spoke, Bill could feel the gloom pressing down on him. Utter depression possessed him and he shambled into the house like a zombie. What was the use? He couldn't fight it. All the spirit, the old fire, went out of him. He went into the shack and looked around. What did he see? An empty shell of what it was. Silent rigs, dust, disorder. There just didn't seem to be any point any more.

Suddenly, like dawn breaking across dark horizons, an idea came to him. He would give it up — at least for a while. Take up something else. What about bowls? He had heard that this was a good game and it had one great advantage — it would get him out of the house for long periods. Yes! He'd take up bowls and perhaps one day . . . one day he'd return to his old love — Amateur Radio.

Meantime he'd give it a rest, lay off for a bit and, when the time was right, who knows?

QRX . . . QRX . . . QRX . . . QRX . . . QRX . . . QRX . . . QRX.

AR

CONTESTS

Ian Hunt VK5QX
FEDERAL CONTEST MANAGER

P.O. Box 1234, GPO, Adelaide, SA 5001.

CONTEST CALENDAR

JANUARY

1. UBA SWL Competition, 1985 commences (Rules AR Nov) (I do not propose to list this contest further as it continues throughout the remainder of 1985.)
12 40 Metre World SSB Championship Contest
13 75 Metre World SSB Championship Contest
19-20 160 Metre World SSB Championship Contest
26 15 Metre World SSB Championship Contest
27 20 Metre World SSB Championship Contest
12 Hunting Lions In The Air. (Rules AR Dec)
25-27 CQ WW DX 160 Metre CW Contest.

Ross Hull Memorial Contest continues to finish 7th January. (Rules AR Nov)

FEBRUARY

9-10 QCWA CW QSO Party
9-10 YL-OM Phone Contest.
23 RTTY World Championship Contest. (Rules this issue.)
22-24 CQ WW DX 160 Metre SSB Contest
23-24 John Moyle Memorial National Field Day Contest.

MARCH

30-31 CQ WW WPX SSB Contest

There are various different types of contests but they all have a number of common features. Two, most important, are the overall technical capability of the station equipment, (will the gear perform at its best for the continuous hours operation?) and the skill of the operator to be able to keep his contact rate running at a maximum for the full duration of the contest. The latter is probably the most important factor of them all as it has been shown many times that a top class operator can produce a winning performance without access to high power, big beams etc

It is great to have fun during a contest but for those who are truly contest-minded the whole thing becomes a really serious matter. In this vein I might expand on a point which I have been considering for several years now, but I accept the right of people to have differing points of view. I remember wondering about this when a number of years ago the current Federal Contest Manager, I think it was Peter VK4PJ (and no offence meant Peter) came out with a proposal that the Remembrance Day Contest should become known as 'The Friendly Contest' Now this came as a bit of a shock to me. I had always pictured a contest as a bit of a battle, somewhat akin to a couple of fighters getting into a boxing ring. I somehow could not accept the philosophy of one giving the other just a friendly punch to the nose You will certainly accept though, the fact, that even boxers have to fight within the rules and they may even be the very best of friends both before and after the contest. Such it is, I believe, with our contests You fight as hard as you can although you fight fair. Cheating is obviously outlawed, dubious operating practices may well be questioned by the Contest Manager and in fact many contests contain provisos which allow disqualification of an operator who consistently departs from the well recognised code of operating ethics.

One important side of contest operating is speed, although this should never be such as to sacrifice accuracy. If this occurs you are not a good contest operator as it will undoubtedly lead to loss of points. Incidentally I can well remember an operator on RTTY replying to me when I asked why his transmission contained so many mistakes that it was not his fault as his teletype machine would not operate as fast as he wanted to type. There are some of the fraternity who join in a contest just to give out numbers for fun and in a contest such as the Remembrance Day to help their state along. If you are one of those I believe that you are welcome as the serious operator appreciates the additional contact which you provide to him. I would ask though that you also respect the fact that the other guy wants to make his contact as quickly as possible and move on to his next, so please do not aggravate him by adding extraneous detail such as my name is . . ., and I am running 50 watts here from my QTH at Oodnnawoop-woop to a dipole. Simply give him the number he desires and then you can usually find someone else who wants to rag-chew rather than contest. Similarly however the serious contester should be as patient as possible with someone who is somewhat slower than might be desired for various reasons. Remember you had to go through stages before you became a Hot Shot operator, and after all the other station is providing you with the courtesy of another contact which you otherwise would not have. Slowness may be due to inexperience, age maybe or even a state of temporary confusion. Please never let it be that you could not be bothered checking up as to what is required before joining in even if you personally are not all that interested in contests.

There is one situation which I have run across many times, particularly in our own local contests, and this is one which shows a lack of understanding on the part of many operators. I have just made a contact with an operator, whom I tuned to and called, and then I in turn am called by yet another station on the same frequency. I would agree that the use of the frequency is probably the right of the first station which occupied it, if such a right does exist, but it does no harm for him to stand by and allow me to make my very quick exchange with the station calling me before I shift away from his frequency. You might think that this sounds unfair, nevertheless I find that the most complaints about this practice seem to come from those operators who are actually pretty slow and ineffective. Most of the top operators will stand by and allow the other guy to make his quick contact and in fact are usually pleased to do so as it allows them a quick break before calling CQ again. If you do not believe me on this score ask about amongst the top scoring contest men as they realise that such quick contacts and courtesy and understanding benefit them. Deliberate QRMing to prevent such a quick second contact taking place smacks of a spoilt little boy attitude.

Usually a contest is not the place to be for the purpose of chasing rare DX contacts. But there are always exceptions to the rule, such as the annual WPX Contest which is fine for chasing and obtaining new prefixes for the WPX Award. However that is one thing that contest is specifically designed for. Unless there is a very good reason to believe otherwise don't expect the contester to appreciate your QSL card after the contest when he has probably worked hundreds of other stations in your call area

Before a major entrant competes in a contest he has usually psyched himself up for a big effort. All his activity beforehand, preparing logs, check sheets, operating aids, cleaning up the shack, and even practising staying up all night or maybe getting in extra sleep and rest is accompanied by his thoughts and plans toward the various strategies he will adopt. Such things include planning which band to begin the contest on and then which band to QSY to next. *What will be the best direction to keep the beam pointed in for the majority of time? Which prefix or country to give priority to or which particular rig to use on which band and whether or not to use a particular microphone?* There is no doubt whatsoever that such an approach pays off and I recommend some thought on these aspects of operation.

Some operators tend to use the technique of staying as far as possible on one frequency and calling CQ. This is OK as long as replies are coming in however it becomes an obvious waste of time and does little else but produce unwanted QRM when the going gets slow. If no reply is received after about one-and-a-half minutes calling you will always do far better to tune the band and ascertain just what is going on. It may well be that propagation on the particular band is just going out. You can also pick up new contacts by carefully tuning a band from top to bottom and finding those who for some reason are not prepared to tune more than a few kHz one way or another. By and large the main aim is to be doing something all the time which might produce some worthwhile result rather than have no contacts.

A poor practice, adopted by some of the inexperienced in the false belief that they are operating faster, is to call a station and give him the serial number before he has acknowledged the first call. Mostly this practice merely slows things. Even the best operators are working to a fixed method and whilst fast and usually flexible they are not expecting this, so they will probably ask you to give the serial number again anyway. It also creates confusion, particularly when the station who has been called and sent the unsolicited number goes back instead to someone else. Thus your time in sending the serial number has been wasted whereas the short snappy call would more probably have produced a result

Again I suggest that you observe the operating procedures of the top scoring operators and try to emulate them. They have proven their methods by the results they obtain.

Finally, another little story comes to mind as light relief. One operator told me he could not understand why his points score each year was not keeping up with the rest of the top operators. He explained that he planned very carefully each year and entered the contest with a really good organisation behind him. He had a whole band of helpers; one to run the two tape recorders sequentially so as to ensure that no contact missed being recorded, another to operate the playback machine to double check the number exchanges, another to scan the other bands with other receivers, yet another to keep the log and another the check sheet etc It even came out that he had at least two other members of the team to produce the food and drink and chop the wood for the fire. The question followed as to how many my back up team comprised. He seemed absolutely staggered when I replied that I did all the work except that my XYL backed me by ensuring that I had a cold drink nearby all the time and something light to eat now and again. There was no doubt that all the extra planning in the case of my friend and the mammoth organisation behind him was in fact holding him further back all the time.

Best of luck with your contest operation next time you enter one.

In the December issue I raised again the matter of the dates of our various contests and proposed a plan to rationalise same. You will note that the date for the John Moyle Memorial National Field Day Contest has now been set to as late as possible within the month of February. The rules for same will appear in next months issue of AR. In changing the date to this extent I have gone as far as I can without actually moving the date to another month later, as proposed. I have done this for several reasons. Firstly the majority of feedback, indeed without exception, has been in favour of my proposal for this contest. This feedback has come from on air discussions with amateurs in both VK5 and other states, letters from individuals and various radio clubs and also personal discussion with other operators and representatives of clubs.

I recently paid a visit to Wagga in VK2 and was most kindly made welcome by amateurs there. I took the opportunity of raising the subject with the President of the Wagga Amateur Radio Club who immediately contacted various club officers and members and from them obtained an opinion. Needless to say that opinion was generally in favour of such a change also. It is such interest and action as this which is appreciated when one has a job to do

Thus I trust that the aims advanced for a change may have, *at least in part,* been met. These are, to get the Field Day Contest away from the fire danger season and to remove it from the great WET period as far as the boys in the north of the country are concerned.

It would appear nevertheless that any such changes as proposed may not meet with the approval of all, Federal Councillors. The matter of contest dates was proposed for discussion by the VK5 Division at the 1984 Federal Convention, however the motion lapsed for want of a seconder thus no discussion was held on this subject.

I would therefore ask that if you have an opinion on this subject, and even if you have already written to me on your own behalf or representing a club, could you please put pen to paper again and make such opinion known to your Federal Councillor and the Council Members of your own Division. Maybe this way we can have it seen that a proper consensus of opinion is taken notice of.

REMEMBRANCE DAY CONTEST RESULTS

Pressure of work and other important activities has delayed the completion of results for this contest. You should see such appear in the February issue of AR as was the case last year.

One certainly learns by experience, and I feel that once having dealt with the large number of logs for this latest RD Contest I will be much better placed to handle such matters in future.

I would also like to express my appreciation for the advice and assistance provided by Peter VK4PJ and Neil VK6NE both of whom are previous contest managers. Peter in particular forwarded to me a copy of 'A Guide to Federal Contest Managers' which he had compiled several years ago.

REMEMBRANCE DAY CONTEST CERTIFICATES FOR 1983

Efforts to sort out the situation with regard to these certificates are still being made, so if you should have been the recipient of one of these do not yet give up hope of receiving same.

VK NOVICE CONTEST 1983

Certificates for this contest were mailed out several months ago so all concerned should have received same by now. Our thanks are due to our Secretary/Manager Reg Macey who arranged for new certificates to be printed at rather short notice once matters had been sorted out as to just what had occurred. We are still however looking for the trophy for that contest and I hope that by the time you are reading this we will have located it.

VK NOVICE CONTEST, 1984

The due date for receipt of logs of 29th October is now well past and a rather dissappointing total of about only 30 logs have been received. Coming right on top of the Remembrance Day Contest this perhaps may not be unexpected, probably as I have previously pointed out this is a good reason to move the date of the Novice Contest. If no more logs than this are received for a contest it makes it hardly worth the effort of organising. Checking of the logs and preparation of the results will take place as soon as the RD Contest work is completed.

CONTRIBUTIONS TO THIS COLUMN

As well as hearing from you regarding contest matters, rules etc, I would be very pleased to receive anything else in the way of material which you feel may interest others in connection with contest operation. I would also be very pleased to receive any photographs of contest operation stations both of individuals and clubs. There should surely be some good Field Day Contest photos somewhere about. *Do you have any favourite hints about the way you operate which you would like to pass along, or maybe details of a nice easy to assemble portable 5 element 40 metre yagi for a Field Day?* Any material along these lines will be welcome as I am sure that photos and diagrams etc, are a lot more interesting than just pages of print. I also have under consideration the idea of a guest writer from time to time, specifically someone who is well known as a regular and successful contester. So again if you think you would like to contribute in this way please let me know.

Now the 1985 contesting year is upon us and I like to think that it will be a year of both expansion and enthusiasm in this area of our hobby activities. Rest assured that if there is any way I can see in which things can be made more exciting or interesting I will do my very best to implement whatever is necessary. I do acknowledge that I have received quite a number of suggestions in connection with scoring for some contests, some members have suggested that larger states, eg: VK4 and VK6 should be divided up into smaller areas for contest purposes, differing methods of 'exchange' within contests have been proposed, many and varied are the suggestions overall. Whilst all such ideas are appreciated, and indeed I still welcome them, I must point out that it is not always easy to include them in the contest rules and that changes have to be carefully thought out before being applied. Thus it may take some time to sift and select from the many ideas and the changes possible will not happen overnight

Another suggestion which I have made to the Federal Executive is that a standard log sheet should be developed and printed in quantity for issue for contests. It would be then be expected that entrants should all submit their logs on the standard form. I am awaiting comment from the Federal Office on this suggestion following which, if the idea is accepted, arrangements would be made to produce a suitable format. Any ideas on just what such a log sheet should look like would also be welcome. It would be necessary to decide how the matter of costs should be dealt with although it is my belief that if such a task was done on a national basis it should not turn out to be too expensive. Some individual Divisions already issue log sheets for such as the RD Contest. At the same time it could well be that the standard log sheet provides for the necessary declaration, entry details and operating summary etc as well as contact information.

So, here again are some of the ideas being turned over in my mind as a means of improving contest operation here in Australia. For now, I once again pass along my best 73 to you. I trust that you have had a enjoyable Festive Season and I wish you all the very best for a successful and satisfying 1985 May your contest operations provide you with much pleasure.

FOURTH ANNUAL RTTY WORLD CHAMPIONSHIP CONTEST

Sponsored By. The RTTY Journal and 73 Magazine.

Contest Period: 0000 to 2400 UTC 23 February, 1985.

Rules: The same station may be worked ONCE ON EACH BAND Crossmode contacts do not count. Single operator stations may work 16 hours maximum, while the multi-operator stations may operate the entire 24 hour period. Off times are NO LESS than 30 minutes each and MUST be noted in your log(s).

Operator Classes: (A) Single Operator, Single Transmitter. (B) Multi-operator, Single Transmitter.

Entry Categories: (A) Single Band. (B) All Band, 10-80 Metres

Exchange: Stations within the 48 Continental US States and Canada must transmit RST, and State, Province/Territory. All others must transmit RST and consecutive contact number.

QSO Points. 5 QSO Points for contacts with W/VE stations located within the Continental US and Canada. 10 QSO Points for all other contacts.

Multiplier Points: **1 Multiplier Point** is awarded for each of the 48 Continental US States, (A District of Columbia contact may be substituted for a State of Maryland multiplier), Canadian Provinces/Territories and DX Countries worked on each band (excluding US and Canada).

Final Points: Total QSO Points multiplied by Total Multipliers equals CLAIMED SCORE.

Contest Entries: Entries must include a SEPARATE log for EACH BAND, a dupe sheet, a summary sheet, a multiplier check list, and a list of equipment used. Contestants are asked to send a SASE to the Contest address for Official Forms.

Entry Deadline: All entries MUST be POSTMARKED no later than 16 April, 1985.

Disqualifications: Omission of the required entry forms, operating in excess of legal power, manipulating scores or times to achieve a score advantage or failure to omit duplicate contacts which would reduce the overall score more than 2 percent are all grounds for immediate disqualification. Decisions of the contest committee are final.

Awards: Contest awards will be issued in each entry category and operator class in each of the US Call Districts, Canadian Provinces/Territories as well as in each DX Country represented. Other awards may be issued at the discretion of the awards committee. A minimum of 25 QSOs must be worked to be eligible for awards.

Contest Address: Enclose an SASE to: *RTTY World Championship Contest, C/- The RTTY Journal, PO Box RY, Cardiff, CA 92007.* **AR**

MICROCOMPUTER CONVERTS BRAILLE INTO PRINT

A microcomputer system which converts braille into print to help blind people at school or work has won an award, presented by the BBC for the best invention to help the unsighted.

The winner is Dr Tom Vincent, a physics lecturer, for his development of the Work Station, which enables a person to type in braille, produce a simultaneous printed version, and then, with the help of a voice synthesiser, to check the print version independently.

Dr Vincent, 49, has also devised ancillary software which enables a blind person to make use of word processing facilities, and keep personal braille records on floppy disks. *from Information Technology from Britain* **AR**

TEST EQUIPMENT

Melbourne's largest range of secondhand:

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Tektronix

Marconi

Solartron

Boontoun

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EDUCATION NOTES

Brenda Edmonds, VK3KT
FEDERAL EDUCATION OFFICER
56 Baden Powell Drive, Frankston, Vic 3199

This month "go to it" and see how you would fare with this sample AOCP Examination Paper.

Select the correct or most appropriate alternative

1 The inductive reactance of a coil may be calculated from the
a resistance of the coil and the frequency applied
b frequency applied and the inductance of the coil
c frequency applied and the Q of the coil
d inductance and resistance of the coil

2 Chokes are not used in low voltage high current power supplies because
a of the excessive voltage drop across them
b they do not have a smoothing effect at low voltage
c they overheat with high current
d they have a very low inductive reactance

3 A dip oscillator is an instrument which:
a shows a rise in current when power is absorbed by the tuned circuit under test
b is sensitive and measures the exact resonant frequencies of L-C circuits
c can be used only on energised circuits
d is inductively coupled to an L-C circuit to measure its resonant frequency

4 A receiver requires a 12 volt DC power source. You could use
a 12 nicad batteries
b 10 dry cell batteries
c 10 nicad batteries
d 8 nicad batteries

5 A vertical antenna may be described as
a being omnidirectional in a horizontal plane
b having a spherically polarized magnetic field
c having primarily a high angle of radiation
d having maximum radiation in the vertical plane

6 Capacitors with mica or ceramic dielectric are used in radio frequency circuits because they have
a low dielectric loss, low inductance, and low insulation resistance
b lower capacitive reactance than tantalum or paper capacitors
c low dielectric loss, low inductance and high insulation resistance
d low dielectric loss, high inductance and low insulation resistance

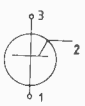
7 A power supply is designed to reliably provide an output of 12 volts DC at 20 amps. The main components rating should be:
a transformer — 20 V, 30 amps; capacitors — 2 x 32 µfd; bridge rectifier — 40 V, 10 amps
b transformer — 30 V, 20 amps; capacitors — 2 x 4000 µfd 50 V; bridge rectifier 20 V 20 amps
c transformer — 12 V, 30 amps; capacitors — 3 x 4000 µfd; bridge rectifier — 35 V 35 amps
d transformer — 20 V, 30 amps; capacitors 3 x 4000 µfd, 50 V; bridge rectifier — 50 V 35 amps

8 When using a resonant antenna, the voltage SWR measured at the transmitter output is 3:1. The SWR should be reduced by:
a shortening the antenna
b using heavy duty coaxial transmission line
c lengthening the antenna
d correcting impedance mismatching

9 In radio-teletype transmissions
a the message is conveyed by frequency shift keying
b hand keying is used to set the spacing
c grid block keying is used to reduce interference
d the keying is controlled by the phase shift

10 Variable frequency oscillator systems for use at VHF usually employ heterodyning rather than frequency multiplication because
a it is difficult to build crystal circuits to provide the required high order of overtones
b the stability of the oscillator is not important
c frequency measurement is made easier by heterodyning
d it avoids the multiplication of oscillator instabilities

11 This symbol represents a



a PNP transistor and 2 is the collector
b triac and 1 is the emitter
c zener diode and 3 is the cathode
d silicon controlled rectifier and 2 is the gate

12 In high level modulation, the audio signal
a modulates the carrier in the final stages of the transmitter
b is filtered to boost the lower frequencies
c is applied at the buffer stage
d is only amplified at the higher frequencies

13 When cathode bias is used in an RF amplifier stage a capacitor is connected in parallel with the bias resistor to:
a reduce the bias voltage
b double the bias voltage
c provide a low impedance path for RF
d block the DC flow between cathode and ground

14 When an alternating voltage is applied to a capacitor, the voltage and current are
a in phase
b 180° out of phase
c 90° out of phase, voltage leading
d 90° out of phase, current leading

15 At a frequency of 1 GigaHertz, each cycle occupies a period of
a 1 nanosecond
b 1000 nanoseconds
c $\frac{1}{100}$ milliseconds
d 1000 microseconds

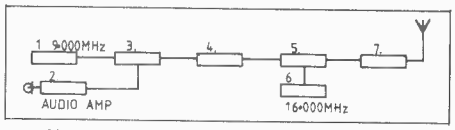
16 In a Class AB amplifier, the operating cycle occupies
a 360°
b between 360° and 180°
c 180°
d between 180° and 90°

17 To achieve adequate intelligibility in a telephony transmission the modulating frequency need not be more than
a 300 Hz
b 3 kHz
c 6 kHz
d 10 kHz

18 The specifications for an SSB receiver quote one feature as '0.5 V for 10 dB $\frac{S+N}{N}$'. The feature referred to is
a stability
b sensitivity
c image rejection
d squelch range

19 The Modulation Index of an FM transmission is calculated from the formula Modulation Index =
a Modulation frequency ÷ Carrier frequency
b $\frac{\text{Modulation frequency}}{\text{Carrier frequency}}$
c $\frac{\text{Carrier frequency deviation}}{\text{Modulating frequency}}$
d $\frac{\text{Modulating frequency x 2}}{\text{Carrier frequency}}$

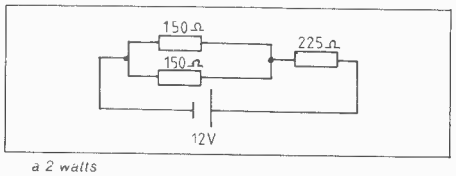
20 In this SSB transmitter block 4 should be a



a filter to separate the two RF oscillators
b narrow bandpass filter
c filter designed to suppress harmonics of 9.000 MHz
d frequency multiplier

21 An SSB receiver uses delayed AGC because
a the AGC system is slow to respond to a signal without a carrier
b a fast attack results in excessive audio output
c a slow release causes hum on the audio output
d a slow release gives a more constant audio output

22 The total power dissipated in this circuit will be about



a 2 watts
b 1 watt
c ½ watt
d ¼ watt

23 The PIV rating of a rectifier in a full wave rectifier circuit should be about
a 2.4 times the secondary RMS voltage
b 3.0 times the secondary RMS voltage
c 1.5 times the secondary RMS voltage
d 0.9 times the secondary RMS voltage

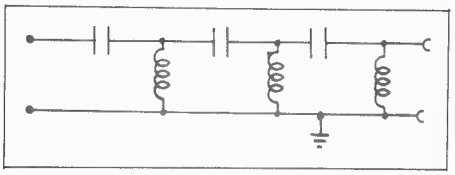
24 Power transistor performance ratings are generally specified at given current and voltage levels but these ratings may not apply if the
a input signal level is low
b operating temperature is excessive
c device is used at VHF or SHF
d resistance of the load is more than 1 KΩ

25 The use of broadband final amplifiers in modern amateur transmitters has made
a matching of the load more critical
b matching to the load more accurate
c the use of an antenna tuner unnecessary
d it possible to cover 1.8 — 450 MHz without any tuning

26 A VHF mobile operator is performing field strength measurements using quarter wave and ⅝wavelength antennas. Differences in performance are likely because the
a quarter wave antenna has a higher angle of radiation
b input to the ⅝wave antenna is several dB greater
c feed impedance of the two antennas is different
d ⅝wave antenna has a larger tuning coil

27 In the event of thunderstorm activity, the risk of lightning strikes into an amateur installation may be reduced if:
a equipment is disconnected from mains power and transmission lines
b transmission lines only are disconnected at the receiver or transceiver
c equipment is disconnected from mains power only
d transmission lines are shorted to the AC earth line

28 This device could be used as a:



a high pass filter at the input to a television receiver
b matching stub on an antenna
c transmitter output filter to prevent radiation of harmonics
d trap in a multiband antenna

29 An amateur transmission on 28 MHz causes interference to nearby television reception on Channel 9 (196 MHz) but not on Channel 2 (64 MHz). It is likely that this problem:
a is the result of poor design in the television set
b can be cured by a low pass filter at the transmitter output
c will decrease if transmitter output power is increased
d can be reduced by better shielding of the transmitter

30 To enable an AM receiver to resolve CW signals it is necessary to add
a an extra IF amplifier stage
b a narrow band filter before the detection stage
c a beat frequency oscillator stage
d a more efficient noise limiter

31 A received FM signal sounds weak but not noisy. This effect occurs if the.
a signal deviation is too wide
b signal strength received is low
c signal deviation is too narrow
d receiver is designed for phase modulation signals

32 Bipolar transistors require a bias current across the base — emitter junction. This can be achieved by using:
a a resistor network
b cathode bias
c negative voltage on the collector
d limiting of collector current

33 A 9.9 k ohm resistor is placed in series with a 100 ohm 0.1 mA meter. The scale will now read
a 0 — 1 volt
b 0 — 10 volts
c 0 — 100 volts
d 0 — 1000 volts

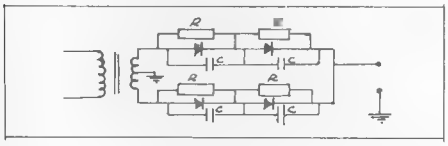
34 Amateur HF band reception is disrupted by a high ambient noise level. At the same time a television receiver shows two broad horizontal interference bands. It is likely that the cause is.
a noise from distant thunderstorms
b a continuous leakage path between nearby power lines
c local oscillator radiation from another television set
d power line leakage to earth occuring on line voltage peaks

35 Short term fluctuations in the strength of an HF signal received from an overseas station may be due to
a upper atmospheric turbulence
b simultaneous reception of ground wave and tropospheric wave
c phase differences between waves travelling different paths
d tropospheric temperature inversions over the ocean

36 A long wire antenna designed for use in the HF band
a should be fed with two-wire transmission line at a current maximum
b will radiate most of the power in a direction parallel to the wire itself
c should be cut accurately to an uneven number of half wavelengths only
d will always have a voltage minimum at the free end

37 A transformer has a Primary:secondary turns ratio of 10:1. An 8 ohm load is connected to the secondary. The primary impedance will be:
a 100 ohms
b 800 ohms
c 8 ohms
d 0.8 ohms

38 In this rectifier circuit the

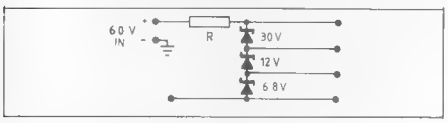


a ripple frequency of the output will be four times the frequency of the input
b capacitors are used to protect the diodes against voltage 'spikes'
c PIV rating of the diodes should be twice that required if single diodes were used
d resistors are used to provide output voltage regulation

39 The 'gain bandwidth product' of a transistor is the:
a frequency at which the gain becomes unity
b ratio of base current to collector current
c range of frequencies which can cause partial or complete phase shift
d ratio of output impedance to input impedance

40 Forward bias values required for solid state diodes to conduct are about
a germanium 0.2 volt, silicon 0.6 volt
b germanium 0.01 volt, silicon 1.6 volts
c germanium 0.6 volt, silicon 0.2 volt
d germanium 6 millivolts, silicon 2 millivolts

41 Regulated voltages obtainable from this arrangement could include



a 60V, 90V and 102V
b 30V, 18V and 5.2V
c 30V, 42V and 48.8V
d 30V, 12V and 6.8V only

42 The 'polarisation' of a radio wave refers to the
a direction of the magnetic field
b compass alignment of the antenna
c angle of radiation with respect to the earth's surface
d direction of the electric field

43 The sunspot cycle:
a recurs about every 27 days
b may be responsible for sudden changes in propagation conditions
c is caused by slight variations in the distance between the Earth and the Sun
d has an average period of about 11 years

44 Self oscillation in a vacuum tube or transistor stage
a may occur when its output and input circuits are tuned to the same frequency
b is usually due to negative feedback between output and input
c will not be apparent to the operator unless the signal is displayed on a cathode ray oscilloscope
d is rarely responsible for any radiation outside the amateur bands

45 The accuracy of a moving coil voltmeter will be adequate if.
a a diode is used in series with the meter
b a high resistance shunt is used across the voltmeter
c the internal resistance of the meter is as high as possible
d the internal resistance of the meter is as low as possible

46 The resonant frequency of a parallel tuned circuit
a is the frequency at which the circuit impedance is minimum
b will depend on the voltage applied
c will increase if the capacitance or inductance is decreased
d is the frequency at which reactance equals resistance

47 A television receiver suffers interference on all channels when a nearby amateur station transmits. This problem could be reduced by
a increasing the output power of the amateur transmitter
b inserting a low pass filter at the television input
c changing polarisation of the television antenna system
d using a high pass filter in the television antenna lead

48 A double conversion superheterodyne receiver usually
a has a low first IF for sensitivity and a high second IF for good stability
b includes a regenerative detector
c is less likely to suffer from cross modulation than a single conversion type
d has a high first IF for good image rejection, and a low second IF for good selectivity

49 FM receivers exhibit a characteristic known as 'capture effect'. This means that
a they can resolve a wide range of frequencies
b only small antennas are required because of their high efficiency
c a very narrow band filter has to be used to block unwanted frequencies
d only the strongest signal received will be demodulated

50 Tropospheric ducting may
a cause HF signals to fade suddenly
b allow extended long distance VHF communications
c occur as a result of meteor showers or auroral activity
d occur more frequently at HF than at VHF

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RADIO TELESCOPE BREAKS THE SPACE BARRIER

The origins of galaxies in deep space can now be examined for the first time with a new kind of radio telescope developed in Britain by a team of Cambridge astronomers.

Known as the Cambridge Low Frequency Synthesis Telescope, it consists of an array of 2-300 Yagi aerials dotted along a five km line. The Yagis pick up long, two-metre wavelengths which are converted by a central Nord computer into optical photographs for examination the next morning.

"This is a big advantage," says Dr John Baldwin, who is in charge of the project. *"Previously it has taken up to two weeks to analyse the results obtained with existing radio telescopes. Also it is the first telescope that has been designed to overcome the effects of the atmosphere which until now has always made the imaging of astronomical objects extremely difficult."*

Because the telescope opens up a new wavelength, Dr Baldwin is confident that it will reveal objects that are unlike objects seen on other wavebands. *"We might expect to find in our milky way quite new stars that give out radio waves specifically at these long wavelengths,"* he explains. *"Also, we can expect to see things that are particularly old. For example, after 10 to 20 million years many radio galaxies will disappear at short wavelengths, but will leave large clouds behind which will radiate at long wavelengths for perhaps 100 million years or so.*

"The problem we would like to sort out is where do galaxies come from and how does the Universe evolve to form the universe as we see it now."

According to Dr Baldwin, first results have come up to expectations with vast numbers of previously unrecorded objects being detected, including some very large objects measuring several million light years across, and in one case an age of 300 million years has been put on an electron cloud to indirectly reveal the galaxy's speed across the sky.

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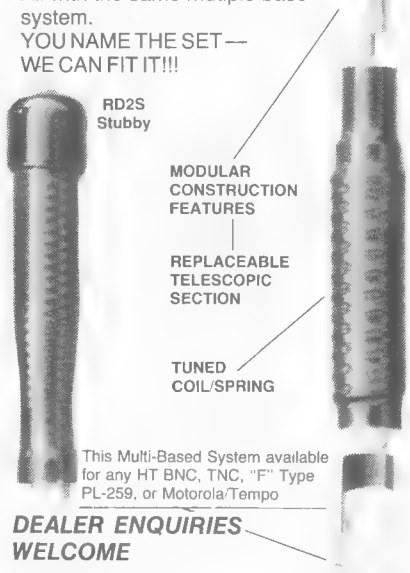

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FORWARD BIAS

VK1 DIVISION

"Happy New Year" to readers and I hope you have a better year than last.

"HOW TO BECOME AN AMATEUR RADIO OPERATOR"

The VK1 Division of the WIA holds lecture classes each year for those people wishing to become amateurs, or those operators wanting to up-grade to a higher class of licence. There are two classes available. The Novice (NAOCP) and the Full Call (AOCP).

NOVICE CLASSES

These will begin on the 5th February 1985, at 6.30pm, in room 13 the Griffen Centre, Civic, and this course will continue until the 12th November 1985. The course will not have any breaks in it and will always be on Tuesday nights. The fee for this course will be approx $45, this also includes the text book that will be used throughout the year. The course provides basic electronic theory and Morse code practise at 5 WPM and constitutes the ground work for a beginner to enter the fascinating world of amateur radio.

FULL CALL CLASSES

These classes will commence 7th February 1985, at 6.30pm in room 13 the Griffen Centre, Civic on Thursday nights and will continue until the 8th August 1985. The fee for this course will be $40 and the student supplies his/her own text books. These books are available from the WIA bookshop at the general monthly meetings. This course is suited to the holder of a Novice Licence or the person that has knowledge in electronics and wishes to gain information on the finer points of radio theory, propagation, antennas and circuit analysis etc for the purpose of gaining an amateur radio licence. This course also provides tutoring in Morse code at 10WPM.

This year we are also offering something for the student that wants to do both courses. The fee will be $55, a massive saving to the student of $30.

People wanting to enrol in any of the courses offered should contact Alan Hawes on 58 2568 at home after 7pm, or contact one of the committee men at the monthly meeting.

1985 ANNUAL GENERAL MEETING

In accordance with the Division's Constitution, notice is hereby given that the AGM will be held on the 25th February 1985 at 8pm, at the Griffen Centre, Civic, and all are welcome to attend.

The order of business will be as follows:

**to receive from the Committee, Auditor, Federal Councillor, Public Officer and other officers, reports on the Divisions transactions and business during 1984;*

**to elect the officers and committee members for 1985;*

**to elect the Federal Councillor; and*

**to appoint the Auditor and determine his renumeration, if any.*

Nominations of candidates for election of officers of the Division or as a committee member, must be in writing, signed by two members of the Division, who are holders of a current Australian transmitting licence, and accompanied by the written consent of the candidate. The nomination is to be delivered to the Public Officer at least ten days prior to the date of the AGM. Nomination forms will be available at January's general meeting.

So, let's see those nominations arrive, and don't leave it to "SOMEONE ELSE" because he died a long time ago.

YOUR DIVISION NEEDS YOU!

MEMBERSHIP FEES

By now you should have paid your 1985 membership fee, remember our Constitution, if you're not financial, you're not a member, therefore you don't receive the benefits of the QSL bureau, and what would life be like if you couldn't receive Amateur Radio every month, delivered to your home. Life just wouldn't be the same.

MEETING DATES FOR 1985

All meetings will be held at the Griffen Centre, Civic, 21 Jan., 25 Feb., 25 Mar., 22 Apr., 27 May, 24 Jun., 22 Jul., 26 Aug., 23 Sep., 28 Oct., 25 Nov.

The meetings normally start at 8.00pm, however, the room is usually opened at 7.30pm, so that members can collect their QSL cards and look over the Book Shop.

VK1WK REPORTS

There is little doubt that 40 metres is going to provide some interest during the summer months in Eastern Australia; as I write there are brilliant, but rather noisy, openings to Europe at 1900UTC and the USA 1200UTC. Follow the "grey line" for maximum benefit.

Solar antics in the latter half of 1984 have played havoc with 20 and 15; the only regular openings of late on 20 have been 0930UTC to South America (short path), Europe 0500 (long path), and the USA, on 15, from 2300-0200UTC; nothing heard on 10!

By the time this literary gem receives publication your humble correspondent will be holidaying back in the Americas as VK1WK/W2/VE and resurrecting the old callsign as LU8EBI/PY/CE/CX and looking for VKs at 0930UTC on + 14.104 MHz over the South Pole. So New Year greetings to all, signed John VK1WK.

My thanks go to John who always comes to my rescue when I need some interesting material to finish off with.

Well that's it for another month and in my case this will be the last time I will be writing this column, (who said thank heavens). However, before I hang up my typewriter, I would like to show my appreciation to Alan VK1KAL, the Committee, and the lecturers, and the members of the VK1 Division, especially Theo VK1KV, who was always prepared to lend his station to me and be my engineer on the weekly broadcasts. My sincere thanks to all, and my best wishes to the incoming Committee for 1985.

Cheers for now. *John VK1KJM. Editor.*

AR

INTRUDER WATCH

Bill Martin, VK2EBM
FEDERAL INTRUDER WATCH CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW 2077

It's nice to be able to open the column sometimes with congratulations to someone. This time it's to Don VK2JYI, formerly VK2VYI, a staunch supporter of the Intruder Watch, and nice to see him upgrade. Well done, Don

During the period of daylight saving time, the Thursday evening 3.540 MHz Intruder Watch Net will be scheduled at 1000 UTC. Personally, I am looking forward to the end of daylight saving. How many times have I sat at the rig, awaiting a net or sked, only to realise that I'm an hour early!

Nice note from Brian L60099, who sent some useful information re the IW, and look forward to more from him, and other SWL's who may want to help out

I would like to point out, by the way, that, for reasons of compilation, etc, for Amateur Radio, this column must be written two months in advance, and it can be difficult sometimes to get current news into the magazine while it is still topical.

The month of September last, saw good support from around thirty amateurs and SWLs, and reports arrived from every state of Australia, which is very gratifying.

News from the DOC is that they are monitoring the frequencies used by the USSR intruder, 'UMS', who has been active for a number of years on 14.141, 14.171, and 21.032 MHz.

Bearings on a RTTY intruder on 14.218 MHz would be appreciated from those who have beams, and we might be able to track down this nuisance, who operates nightly, he is always there around 0700 UTC, and comes into this shack at 10dB over S9. He is usually to be found idling for great lengths of time.

Any VK5 amateur might like to listen for the fourth harmonic of 5AN, Adelaide, on 3.564 MHz, and we'll see how wide-spread it is. Last heard at 0650 UTC

I hope the support of VK amateurs and SWLs is as forthcoming in the new year as it was in the old, and will say 'all the best' for 1985, and hope the solar cycle makes an upward turn shortly; see you next month.

AR

H-E-L-P!!!!

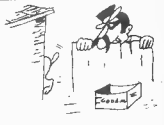
VK NOVICE CUP

The Executive seeks information regarding the whereabouts of the Novice Cup which was last heard of in 1982.

If you can throw any light on the situation please contact the Federal Secretary, Box 300, Caulfield South, Vic 3162 or telephone (03) 528 5962.

AR

STOLEN EQUIPMENT REGISTER



In accordance with 1984 convention motion 84.17:01 the Federal Office has established a stolen equipment register.

Members wishing to take advantage of this register, either to publicise their loss or to check equipment offered to them may write or telephone the Federal Office their queries.

ICOM IC25A	*03831*	*VK2DPM*
ICOM IC45A	*01876*	*VK2DPM*
ICOM IC211	*6804309*	*VK3BRV*
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D S EXPLORER 70cm Transciever. Has extensive internal mods.

VK2 MINI BULLETIN

Tim Mills VK2ZTM
VK2 MINI BULLETIN EDITOR
PO Box 1066, Parramatta, NSW 2150

May I start the notes this year by wishing all members all the best for 1985, in this the Institute's 75th Anniversary Year. This Division, as will all others, is holding special events through-out the year to celebrate, more details in later issues.

TIMETABLE OF EVENTS

In a timetable of general events for this year. The VK2WI broadcasts will recommence on Sunday the 13th January. The Central Coast ARC Field Day will be held on Sunday the 17th February at the Gosford Showground. The next Conference of Clubs will be held in Sydney, the weekend after Easter, hosted by HADARC, and included in the agenda will be discussion of the Federal Convention agenda items. Should you or your group have items which need Federal or national discussion or involvement these should be submitted now to Divisional Council for consideration, checking that they have not been previously dealt with at a Federal Convention, and if suitable submitting to the next convention. The closing date for Federal items is late March. It is hoped to include the annual fireworks night at Dural on the Saturday night of the Conference of Clubs.

MEETING TIME

The start of a new year is also the time for Divisional business. The Annual General Meeting is held on Saturday the 30th March. The closing date for agenda items to the AGM, as well as the nominations for Council is 27th February. Several members of the present Council are not standing for re-election for the next term. It is also sometime since there has been an election. Don't let this keep you away, but "Member" involvement is required in the running of the Division and the more help received, the less the present personnel have to double up with various jobs. There are times when there are not enough hours in the day to do everything and this has happened to Sue VK2BSB. Sue has recently started a business venture and has had to drop off Divisional Council. Her place for the balance of the Council year has been filled by Roger VK2ZIG. I am sure that all will wish Sue the best in her new activities and thank her for the time she devoted to the Division.

HELP WITH CALL BOOK CORRECTIONS

Another position to be filled this year is JOTA liaison officer. Tom VK2PDT is not able to continue after the end of 84. If you can help, advise the Divisional office during office hours of 11 am to 2 pm week days, Wednesday evenings 7 to 9 pm on phone 02 689 2417 or via the box number. Stocks of the current Call Book are almost exhausted so you will have to wait until Spring for the next edition. *Do you have any corrections for the next edition?* If so, perhaps include them with your renewal to Melbourne. Everybody should have received their renewal about a month ago. These and matters about renewal go to the Federal Office, except those who need to apply for a concessional status for the first time. These enquiries should be directed first to the Divisional office. Additional information about renewals are included in Divisional broadcasts. It is important that anybody who may find that they are not in a position to renew advise the Federal office accordingly. It is a costly operation having to send reminder notices. I hope that there will be few in that position. In fact why not this year, **every member introduce a new member.**

REPEATER REPORTS

Now for some repeater news. Port Macquarie VK2RPM is to relocate to an elevated site to improve coverage; Goulburn ARC have submitted an application for a two metre repeater, Tumut have sought details for a two metre repeater; Orange, Bathurst and Nowra regions are in the process of applying for 70cm UHF repeaters. The last C of C brought up the high cost of insurance for repeater installations and currently investigations are under way to see if it is practical to have a single cover for multiple sites. For sometime now the Division has held a license for a 23 cm beacon and currently some stages of construction are underway. Help is required with this project and details may be obtained from John VK2EGI, the beacon officer. The assigned frequency is 1296.420 MHz which is in accordance with national band-planning. Recent issues of various electronic magazines have carried a listing for a VK6 beacon on the same frequency. It is hoped that there will be a slight frequency adjustment to take it up to what would be its band plan frequency of 1296.460 MHz, providing that the various reports to date have not been typographical errors.

Some newer amateurs appear to be unsure of the procedure of licensing repeater systems (this applies in other States as well). Co-ordination of an application is in the case of VK2 carried out by the State Repeater Committee. It is their function to have the intending group obtain and supply details about the proposed equipment, and site and permission to be there. They then assess the supplied information and determine channels for the system. Where an application reaches approval stage it is then passed on to Divisional Council and in turn to the Department of Communications. In addition, there is involvement with existing systems where changes or problems may occur. Periodically a news bulletin is produced to keep groups informed on developments. With new and variations to existing systems there is liaison with other groups where there are shared frequencies, both within the State and if required, over the borders. Any group who has a repeater matter should write or ring the Divisional office so that a set of the required paperwork may be sent out to you.

The March issue of AR will have a large involvement for NSW. If you have anything to contribute would you see that it reaches the Divisional Office by the 16th January. Until next month, which will be a few days later than other months.

73 Tim VK2ZTM
AR

Please remember to check the rules of the John Moyle Field Day Contest printed in February AR as there has been a date change.

VK3 WIA NOTES

VICTORIA 150
GROWING TOGETHER 1984

Jim Linton, VK3PC
DIVISIONAL PRESIDENT
VK3 DIVISION

WRITING FOR AR MAGAZINE

The Victorian Division actively encourages its members to contribute articles and/or photographs for publication in the Institute's journal.

Each year those contributions judged to be the best three are given cash prizes under the Kinnear Trophy scheme.

To make it even easy for a member to get started on the article of their choice a guide has been prepared.

Anyone thinking about contributing to AR Magazine and feel they could benefit from some guidelines — write to the AR Liaison Officer, 412 Brunswick Street, Fitzroy, Vic 3065.

REFERENCE LIBRARY

For the benefit of WIA members an extensive reference library is maintained at the Wireless Institute Centre.

Magazines including Amateur Radio, QST, Break-In, Radio-Communications, Ham Radio, 73 and others are available for reading or copying.

If you're looking for a circuit diagram, technical article, or other information — you'll probably find it in the WIA library.

With so many callsigns being re-issued there's been a trend of the new holders curious about the history of their call — this can be checked by using old callbooks in the library.

Photocopying facilities are available for members who want to take copies of magazine articles, and this service is also available to members at cost through the post.

1985 IS HERE

A New Year has arrived with this one looking like being both challenging and exciting.

Already we are half way through the Victoria 150 Award period which ends on 30th April

This award has not only helped our hobby participate in the official celebrations of Victoria's 150th anniversary but has aided our relationships with the state and local governments.

Thank you to those who have gone out of their way to make this award a success by getting on air giving others the chance to work VK3, and qualify for the certificate.

With each New Year comes the tradition of making New Year resolutions — why not make one concerning your hobby and national radio society.

Make 1985 the year you personally encourage someone else to take up the world's best hobby — amateur radio.

It could be someone at work, a friend or even a relative — and the Institute has plenty of printed material to help you.

Just look at page 118 of the 1984/85 Call Book, or get a copy of the WIA leaflet "The Hobby For Everyone" and you'll be more than adequately equipped.

You enjoy your hobby — introduce it to others and let them join our fraternity.

AR

FIVE-EIGHTH WAVE

Jennifer Warrington, VK5ANW
59 Albert Street, Clarence Gardens, SA 5039

A very Happy New Year to you all. One place where it would be a bit warm this time of the year is Whyalla. News of this fairly new club comes from club secretary John Thompson VK5BWB. The President is Alan Flack VK5NRW and the club callsign is VK5BWR. The club meets every Saturday morning at 10.00am local time, at their leased club rooms in Rozee Street. They have established a "Mentor" system for those undertaking examinations. For example a novice would have a full-call "Mentor" to assist with examination preparation. They have also started a club net on Tuesdays at 7.30pm local time on 3.590 MHz ± QRM. Their sister city in Texas, USA, for Jubilee 150 is Texas City and they are looking forward to making contact with a radio club there.

STAY CLEAR

My attention has been drawn to the fact that some clubs are holding their club nets very near to the Slow Morse Practice sessions on 3.550 MHz at 1030 UTC and causing some QRM. If you are the person who is responsible for finding the clear frequency for your club's net (*and I am aware that it is not easy in that portion of the band!*) please spare a thought for those who are trying to copy the slow Morse in order to pass the exam. We have all been there and know what it's like, even if they are not there when you start your net please stay clear of 3.550 MHz. It will be appreciated.

SUCCESSFUL

The display at Morphettville in November turned out to be very successful DESPITE my organisation. There were several times during the previous week when I wondered if we would ever get it together —but we did. My very sincere thanks go to all of the following: Rowland VK5OU, Lindsay VK5GZ, Les VK5KLH, Don VK5ADD, Dave VK5BOB, Max VK5NMX, Ken VK5AGW, John VK5PJG, Ron VK5AAC, Bill VK5AWM, Cyril VK5KEM, Sam VK5TZ, Steve VK5AOZ, Joy VK5YJ, David VK5AMK and anyone else that I have inadvertently forgotten. Our special thanks to John VK5MG of International Communication Systems, for the loan of a brand new TR7950 2 m FM rig.

One special mention I have been saving till last. You may remember that some months back I made a plea for someone who could design posters for displays. Out of the three people who were good enough to contact me, Council decided to accept the offer of Peter Koen (no callsign yet but he's working on it, as is his XYL Pauline) who is a sign-writer by profession. Peter has up-to-date knowledge of the latest materials and persuaded us that a professional display board would be better for our image than a handful of posters and bits and pieces. Those of you who visited the stand couldn't fail to agree that he was certainly right as the stand was the focal point of our display. Our very grateful thanks to you, Peter, and to Pauline who came along to help set it up (and proved an invaluable asset when she and I were sent off to "scrounge" chairs and tables which weren't provided as promised!)

AR

VK4 WIA NOTES

Bud Pounsett, VK4QY
Box 638, GPO, Brisbane, Qld 4001

One of Queensland's radio clubs held their annual general meeting recently. The members examined the club's activities and found that some degree of stagnation had set in, same old programmes, same old committee members. It was time for some new objectives.

Two brilliant ideas evolved from the discussions. One was for the club to contact a scout group, the other to get very serious about intruder watching. Both, its is hoped, will benefit amateur radio. Other clubs around the country might like to follow suit.

Let us look at the scout programme. The members had found that in the recent Jamboree on the Air, the girl guides were much better communicators than the boys. So it was decided to seek out a willing scout group and train them in the art of expressing their thoughts via a microphone to another unseen person.

Do you remember back to when you first began to do this in the privacy of your shack with nobody watching? Generally at JOTA, the scouts have to do this in front of you, the expert, and some of his mates.

If all the clubs around Australia undertook such a programme, JOTA 85 would be a far better exercise for all concerned. It would also give scouts much more exposure to amateur radio and bring some of those scouts into our ranks. The far reaching effect of this would be to have many more amateurs in years to come with scouting experience

Then the thoughts turned to intruders. It was resolved that members would each be allocated a segment of an amateur band. The member would concentrate his efforts on this one part of a band and regularly report to the state intruder watch co-ordinator. This way each person would become familiar with his allotted segment and readily recognise any signal that should not be there. This proposal has a lot of merit. It would appear to be a much better method of attacking this intruder problem. Intruder watching all of our bands can be a tedious business. If every club in Australia adopted this idea, we would become the foremost intruder watching country in the world.

VK4 DIVISION ANNUAL GENERAL MEETING

This takes place on Friday, the 15th of February 1985 at the Playground and Recreation Association Hall on the corner of Love and Water Streets, Fortitude Valley, Brisbane. The time is set down for 7.30 pm and the usual facilities will be available. Bookshop and QSL Bureaux. Doors open at 7 pm.

May I take this opportunity to wish you all a Happy and Prosperous New Year. I would also like to thank all of you for the help that I have received in 1984, not only in compiling these notes, but for QTC, our Queensland insert in AR and for material for the weekly news broadcast. Many thanks

Bud Pounsett VK4QY

AR

ANNUAL MIDLAND ZONE CONVENTION

Will be held at the KANGAROO FLAT LEISURE CENTRE on Sunday 17th February from 10 am onwards; talk in on 2 metres.

Morning tea; Lunch and Afternoon tea provided.

Competitions, the usual Trade displays, Steptoe's corner, ladies events, childrens lollyscramble, soft-drinks etc available.

A bus tour of Bendigo for the ladies for approx 1 hour after lunch. Full details and a map will be in a leaflet in February AR. All welcome.

See you there.

Margaret VK3DML

AR

DISTINCTIVE MARKS FOR TOP STUDENT

A Townsville amateur has become the first student to graduate with the highest distinction possible from the Australian Maritime College in Launceston, Tasmania. Norbert Trupp VK4FXP graduated Summa Cum Laude which means that he passed 75 percent of all subjects with distinction to gain his Associate Diploma in Marine Radio Communications.

Norbert, a former RAAF air traffic control officer, also received three awards sponsored by AWA during the two year course, which he finished last year

He received a prize for the best first-year student, the best second-year student and the best communicator. His name was inscribed on the Honours Roll both years.

Norbert has just recently left Hobart to take up his position as Senior Communications Officer at the Antarctic Base of Davis for a period of sixteen months. His VK0 call has not yet been received

P Renton VK4PV
Publicity Officer
Townsville ARC

AR

Photo left:
Norbert Trupp VK4FXP.

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

"HAPPY MOTORING IN VK LAND" No 2

In Greek history we read that as long ago as 600 BC it was known that amber rubbed with silk acquired the property of attracting small objects. Two thousand years later Dr Gilbert (1540-1603) discovered that many other substances behaved in a similar fashion when rubbed with suitable materials. He suggested that these substances should be called *electrics* (from the Green *electron*, meaning amber). Oh! what would we do without our Greek history.

Today we use electricity in many forms in our day to day living. One of these is the induction coil. Most amateurs will use one in the next twenty four hours when making a QSO to another amateur, be it in VKland, 9Vland or Gland. We also make good use of the induction coil in the motor car which has a petrol engine for motive power. The ignition system of the modern car incorporates an induction coil as a means of providing the high voltage required to produce the spark which in turn ignites the mixture of petrol and air vapour in the cylinders. The distributor, which is in fact a rotating selector switch, automatically connects the secondary of the coil to each spark plug in turn. When the projecting portion of the rotating cam, which is operated by the engine, pushes the contact arm it opens the contacts and interrupts the current in the primary coil. This in turn generates an induced EMF in the secondary and makes a spark at the particular plug which is joined to the coil via the distributor. The position of the cam relative to the engine is adjusted so that the spark occurs at the correct instant. When this happens we have the engine of the car running and turning over at the correct revolutions.

What has this got to do with motoring in VKland? PLENTY. During the second world war, a law was passed in the United Kingdom, which lasted until the war was over (1939-1945), that any person who owned or drove a motor vehicle which had a petrol engine was to make the vehicle immobile, be it for five minutes or five hours, when the vehicle was left unattended. Many people from all walks of life failed to comply with this law, so they were brought to court, fined and in some cases they went to prison, depending on the circumstances. Yes, they did lock up the vehicles, but that was not making them immobile, which could be used by an enemy agent.

Just think. You go for a trip into the bush or a tour of VKland and stop at a roadhouse for a meal, etc. After an hour or so, you come to continue your trip and find the vehicle has gone, along with all your gear. Not to mention the cost, bang goes your holiday. A few months later — a knock on the front door, you answer it, and standing there is the local policeman who tells you that they have found the remains of your car, burnt out, beyond repair. It will cost you plenty to replace it, even with the insurance payout. *Oh what was that, you're not insured.*

Well read on. *How to make your car thief-proof and it doesn't cost you a cent. The next time you park your vehicle, before you lock it up, lift the hood, undo the clips on the distributor and remove the ROTOR ARM. Replace the cap of the distributor and the clips, lower and lock the hood, now lock the car, and put the ROTOR ARM in your pocket with your key. When you come back your car will still be there, nice and safe where you left it. The only thing this small operation has cost you is the time of 45 seconds. Your car cannot be 'Hot Wired' and no tow-truck operator is going to help a thief to steal your car. If a thief breaks into the car, the only damage is a flat battery and a broken window, if the thief is dumb enough to stay in the car that long. Happy motoring!*

73

Brian L Hughes L60099
60 Redcliffe Street,
East Cannington, WA 6107

AR

NOT ALL-SOLID-STATE

There are still many of us who are not all-solid-state and from time to time as we require to replace a vacuum tube or two, we find that the sources of supply are rapidly drying up, with many types not stocked or just not available in Australia.

When all else fails, I have found a reliable source of supply from: Edlie Electronics, 2700 Hempstead Turnpike, Levittown, NY, 11756, USA.

73,
Yours sincerely,

Jim George VK4AJG,
70 Campbell Street,
Sorrento, Qld, 4217.

AR

"SEE KEW DOG X-RAY . . ."

How'd you like your computer to put out those long, boring CQ calls while you attend to the log and other shack duties?

★★★★★★★★★★★★

Well, it's all quite possible with Electronics Today's JANUARY ISSUE feature project:

THE CHATTERBOX ★★★★★★★★★★★★★★★★★★★★★★★★

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ALSO IN THE JANUARY ISSUE:

★ Fixing the VHF/UHF Broadcast Bungle — a sleight of hand with the TV channels and . . . who knows?

★ The Shortwave Babel — listening to non-English broadcasts on shortwave . . . learn Japanese?

★ Fabulous offers on Digital Multimeters — three Univolt multimeters, priced from $65 to $95. Only through ETI.

★ WIN a Philips Stereo Hi-Fi VCR — a simple contest to enter.

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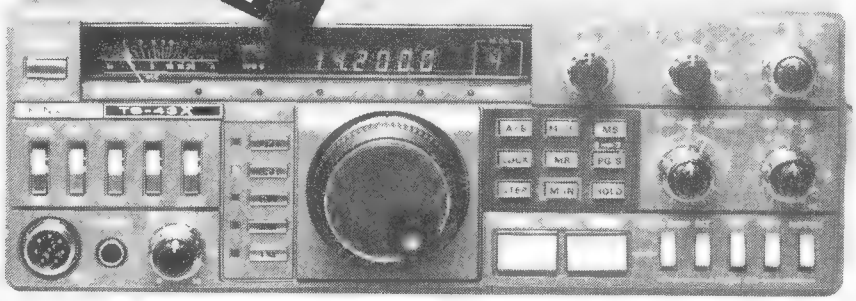

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Sunspots — or the lack of them

Len Poynter VK3BYE
14 Esther Court, Fawkner, Vic, 3060

All good things must end somewhere and Cycle 21 is no exception. The second highest on record is slowly spluttering out. What spots there are, appear close to the solar equator. September's mean just 15.4 with 0 count on nine days. The big question is *how long will these poor conditions last?* Recently the National Geophysical Data centre, Boulder, Colorado, USA published their predictions for the sunspot mimina.

See Table right

SMOOTHED, OBSERVED AND PREDICTED SUNSPOT NUMBERS FOR CYCLE 21

	JAN	FEB	MAR	ARP	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	MEAN
1983	93	90	86	82	77	71	65	66	66	68	67	64	75
1984	60	56	53	54	52	51	50	48	46	44	42	40	50
				(15)	(17)	(18)	(19)	(20)	(21)	(21)	(20)	(20)	(19)
1985	38	37	36	35	34	32	31	29	29	28	27	26	32
	(21)	(20)	(20)	(20)	(20)	(20)	(19)	(19)	(18)	(19)	(19)	(20)	(20)
1986	26	26	24	23	22	20	18	17	16	16	15	15	20
	(20)	(20)	(19)	(19)	(18)	(18)	(17)	(17)	(16)	(14)	(13)	(12)	(17)

The entries with the number in parentheses below them denote predictions by the McNish — Lincoln method. Adding the number in parentheses to the predicted value generates the upper limit of the 90% confidence interval; subtracting the number in parentheses from the predicted value generates the lower limit. Consider for example the Sep 84 prediction tabulated above. There exists a 90% chance that the actual smoothed number will fall somewhere between 25 and 67.

As it takes time to formulate the sunspot number, the delay is causing the sunspot figures to be relegated to historic records as historically the progress of the solar cycle has been measured in terms of "sunspot numbers".

Nowadays the 10cm (2800 MHz) solar radius flux which can be measured more easily and more consistently, has taken the place of the sunspot number.

Sunspot numbers and 10cm flux are similar in that they both indicate the level of solar activity but are different in magnitude. There is a good, but not perfect correlation between two indices. The scales of the two are different. In particular the sunspot number of zero corresponds to a ten centimetre flux of approximately 66.

MONTHLY AV VALUES

SUNSPOT N°	0	20	40	60	80	100	120	140	160	180	200
SOLAR FLUX	66	70	80	100	120	140	160	180	200	220	240

In recent months the 10cm flux has fallen below 70 and this corresponds to a sunspot number close to zero ie solar minima conditions. At this time the spectrum of frequencies available to the HF user has contracted.

Another phenomenon associated with the solar cycle are solar flares. The majority occur in the years across the solar maxima. Then influence in the form of blackouts to communication have eased during 1984 and are adopting the minima pattern.

To bring the indices up to date, the following data appears courtesy of the Ionospheric Prediction Service. Sunspot Index Data Centre and National Geophysical Data Centre.

SUNSPOTS — MONTHLY SMOOTHED NUMBER

PREDICTIONS:

	CLASSICAL METHOD	SIDC ADJUSTED VALUES
10/84	42	35
11/84	40	33
12/84	38	30
1/85	36	28
2/85	35	26
3/85	34	24

TEN CENTIMETRE RADIO FLUX: PREDICTIONS

10/84 = 104 11/84 = 103 12/84 = 99 1/85 = 92
2/85 = 86 3/85 = 84

PROVISIONAL MONTHLY MEAN SSN

4/84 = 68.6 5/84 =75.1 6/84 =46.2 7/84 = 37.0 8/84 =24.8
9/84 = 15.4

RUNNING SMOOTHED SSN FINAL SMOOTHED NUMBERS

7/82 = 115.2 8/82 = 109.4 9/82 = 101.1 10/82 = 95.7
11/82 = 94.7 12/82 = 94.6

1/83 = 92.8 2/83 = 90.4 3/83 = 86.0 4/83 = 81.5 5/83 = 77.1
6/83 = 70.5

PROVISIONAL SMOOTHED SSN

10/83 = 68.1 11/83 = 66.6 12/83 = 63.8 1/84 = 60.0
2/84 = 56.2 3/84 = 52.7

TEN CENTIMETRE (2800 MHz) SOLAR FLUX

	MONTHLY MEAN	HIGHEST DAILY	LOWEST DAILY	PREDICTED
4/84	128.7	183 29/4	94 10/4	119
5/84	128.5	148 10. 13/5	106 6/5	120
6/84	97.4	124 15/6	90 10. 11. 12/6	116
7/84	89.1	104 5/7	74 20/7	110
8/84	83.7	93 10/8	74 19. 20. 22. 23/8	104
9/84	78.1	93 3/9	69 29/9	101

A INDICES

	MEAN	HIGHEST DAY	LOWEST DAY	NO DAYS OVER A15
4/84	19.6	72 26/4	4 22/4	15
5/84	15.5	36 21/5	4 7/5	13
6/84	14.4	34 16/6	3 13, 14/6	11
7/84	15.7	44 13/7	7 26/7	12
8/84	15.1	47 1/8	2 7, 22/8	16
9/84	18.8	55 4/9	2 18/9	13

MEASURING THE STRENGTH OF MAGNETIC DISTURBANCES — THE A INDEX

The disturbance level of the earth's magnetic field is measured by what is known as the "A" index. A indices can be defined on a daily basis by any magnetic observatory in the world. The indices from many observations may be combined to produce a "planetary index" called Ap.

IPS use an A index defined by the Fredericksburg Observatory, a typical mid latitude site in the USA. The A index from WWV is from the same source.

Magnetic field disturbances are assigned to five broad categories

A up to 7 Quiet
A 8 up to 15 Unsettled
A 16 up to 24 Active
A 25 up to 35 Minor Storm
A 36 and above Major Storm

The A is yesterdays index. It is derived from the mean of the K scaling over the 24 hour period and a typical scale looks like

K = 0 1 2 3 4 5 6 7 8 9
a = 0 5 10 20 40 70 120 200 330 500 gamma.

The K index is relatively unknown but it is available from one source. WWV calls the K index just after the Solar Flux and A index is read as: ie "The K index at 0600 hrs UT is 3 repeat 3". If you have recorded your A for the previous days, the K will give you an idea of the movement of this index. As 3 = a20 it can be noted that the field is in an active condition and generally conditions will be poor. If the K was to read 3 across the whole 24 hours as

	0000	0300	0600	0900	1200	1500	1800	2100	0000 UTC
K	3	3	3	3	3	3	3	3	3
a	20	20	20	20	20	20	20	20	20

total 160 ÷ 8 = a20. It's seldom this simple but if you can hear two or perhaps three WWV reports then the trend can be noted — steady as in the example rising, or falling. However this "a" reading is some 120° away from us, in the northern hemisphere and is during the darkness hours when the K is liable to increase. So some compensation should be made and just what you can hear across the spectrum will help analyse conditions.

Probably the best conditions follow a peak in the Solar Flux. As it starts to fall and coinciding with a fall in the A index and very low K figures. These often result in an enhancement effect where there is an increase of some 10-20% over predicted MUFs. I have found that the upward movement of the solar flux tends to restrict rather than enhance. It does depend a lot on what is actually happening on the sun.

If you're charting the indices, any additional information you may come across should be noted in your records to further assist; VK2WI, during their Sunday news service at 11 am local time, give a summary of the weeks solar activity provided by IPS, and you can fill in gaps should you miss out earlier.

WWV at 18 minutes past each hour. IPS phone in service on (02) 269 8614 will provide you with all the details. Changed daily around 0000 UTC. There is no reason why you shouldn't know what is going on from a propagation point of view.

For those interested. The National Geophysical Data Center Solar — Terrestial Physics Division (E/GC2) 325 Broadway Boulder Colorado 80303 USA offer a Monthly Information Product containing Daily Radio Flux of Quiet Sun. Summaries of the entire current sunspot cycle. List predictions of smoothed sunspot numbers Daily sunspot numbers for previous month and includes explanatory text. Cost $US20 for a 1 year subscription. Call 0011-1-303-497 6136 or write. Payment may be made through one of three credit cards VISA, AMERICAN EXPRESS or MASTERCARD. Postage to Australia would be extra no doubt.

Best wishes for 1985. 73 VK3BYE

AR

Ionospheric Predictions were unavailable due to early printing dates this month. Look for them again in February AR.

WECAM
Communication Sales and Service
(Props. B. M. & B. P. Stares)
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NOTICE

All copy for inclusion in the March magazine must arrive at Box 300, Caulfield South, Vic 3162 no later than midday 23rd January.

HAMADS

PLEASE NOTE: *If you are advertising items FOR SALE and WANTED please write on separate sheets, including ALL details, eg Name, Address, on both. Please write copy for your Hamad as clearly as possible, preferably typed.*

*** Please insert STD code with phone numbers when you advertise.**

- Eight lines free to all WIA members. $9 per 10 words minimum for non-members.
- Copy in typescript please or in block letters double spaced to PO Box 300, Caulfield South 3162.
- Repeats may be charged at full rates.
- QTHR means address is correct as set out in the WIA current Call Book.

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being resold for merchandising purposes.

Conditions for commercial advertising are as follows: The rate is $15 for four lines, plus $2 per line (or part thereof) minimum charge $15 pre-payable. Copy is required by the deadline as stated below indexes on page 1.

AMIDON FERROMAGNETIC CORES: Large range for all receiver and transmitter applications. For data and price list send 105 x 220 SASE TO: RJ & US IMPORTS, Box 157, Mortdale, NSW 2223. (No enquiries at office: 11 Macken Street, Oakley, 2223).

□ WANTED — NSW □

HAND BOOK OR CIRCUIT DIAGRAMS for ATU MFJ versa Tuner II model MFJ-941B to photocopy. Please write VK2PWS Wayne Smith, C/- COMCEN HMAS Creswell, Jervis Bay, NSW, 2540.

□ WANTED — VIC □

ATU DRAKE MN 2000, MURCH, KW or similar. Must be in good condition and capable of handling 2 kW. Pay freight. Accept reverse charges. Barry VK3XV. Tel: (03) 527 4029.

KLEINSCHMIDT PERFORATOR. Technical info relating to the adjustment and/or maintenance for the restoration of Kleinschmidt Morse Tape Perforator. Please write or call Dick Hope, VK3DLJ, QTHR. Tel: (03) 528 3380.

□ WANTED — QLD □

SOLDERING IRON TIPS. One or two tips only for Mico 6 V/10 W soldering iron. J George, VK4AJG, 70 Campbell St, Sorrento, Qld, 4217.

□ WANTED — SA □

AT-120 OR AT-130 antenna tuner/SWR meter combination or similar. Also mobile antenna for a Kenwood TS-120V transceiver. Paul Frost VK5KFP, 9 Donald Street, Highbury, SA, 5089. Tel: (08) 337 6268.

□ FOR SALE — NSW □

KENWOOD TR-2500 2 m h/held complete with accessories: PB-25 bat pack, BT-1 bat case, MS-1 mobile stand, LH-2 leather sheriffs case, SMC-25 spkr/mic, VB-2530 25 W AMP. All exc cond. $495 ONO VK2AQW. Tel: (02) 635 6572 BH, (02) 969 2160 AH.

KENWOOD TS-820S digi readout, CW filter, MC50 mic, 12 V DC or 240 V AC, original carton and manual. New cond, best offer around $500, Norman, VK2DLG, QTHR. Tel: (063) 37 3820.

VICOM SWR-RF METER freq 3.5-150 MHz $25. 6 m, 5 el beam, 15 metres coax $35, WW2 Army Morse key $10. 34 AR Actions, 16 CQA Radio, 7 Everyday Electronics, 4 Practical Wireless, 6 Electronic Aust, magazines $20. All of above VG cond. Tel: (067) 92 2666 (BH). Ask for Brian. VK2AKU, (if unavailable leave ph no).

□ FOR SALE — VIC □

ANTENNA TET HB-35C, 5 el. As new. Shifting interstate. To inspect. Tel: (03) 890 4645.

BEAM VS33 20/15/10 Rotator 502CXX. Both new in cartons. $200 each ONO. Also Multiband trap dipole $20. David VK3OD. Tel: (03) 509 2870.

COMPUTER — SINCLAIR SPECTRUM 48 K. With professional keyboard, joystick, tape deck, amplifier, manuals etc. Loads of software including arcade games, word processor, toolkit and compiler. Bargain $380. 2 m handheld AR240. Fully synthesised 140-150 MHz tx/rx, helical antenna, nicads, charger, carry-case, only $210. Exchange either/both for 70 cm transceiver or HF rx/tcvr. VK3CVA QTHR. Tel: (051) 49 4123.

FT209R 2 m hand held tx $330. FT7 never used mobile $350. Realistic Patrolman rx $80. All equipment in mint cond. Stan VK3BNJ. Tel: (03) 743 6708.

RADIO SHACK LINE PRINTER VII: Microprocessor-controlled, dot-matrix impact printer with full ASCII set, dot-addressable graphics, programmable line density and double-width mode, addressable print position, 90 character buffer and more. Centronics parallel or RS232C serial interfaces, TRS80 compatible. Uses 11 cm-25 cm tractor-feed paper. $350 ONO. VK3BLN, QTHR. Tel: (03) 459 1151.

SHACK SELLOUT — Yaesu FT107M tcvr and FV107 VFO, with CW filter, service manual $875 ONO, Kenwood R-1000 Comm rx and matching speak $300, Icom ICPS15 20 amp power supply $180, Icom IC22A 2 m FM rig c/w 3 simplex and 3 repeater channels $145, Icom IC2A 2 m hand held $225, Yaesu XF30C CW filter suits FT101 series $28, Yaesu YM38 scan mic suits FT757, 107, 707 etc $28. Contact Ken Jewell VK3AKK. Tel: (03) 688 9211.

□ FOR SALE — QLD □

DECEASED ESTATE VK4DO — T/S 520 T/C with CW filter, T/S 520 T/C, Kenwood TV 506 T/V, Kenwood TR 2200G FM T/C, Icom IC502 T/C, Swan SW240 T/C, Arlec regulated P/S, Kyoritsu K109 SWR meter, Sansei SE405 SWR meter, Yaesu FLDX2000 HF linear, Copal digi clock, 2 Morse keys, Peak 7200 multimeter, VTVM meter, 2 12 volt batt chargers. Quantity sundry radio equipment. All offers considered. Send SAE for further particulars, to Mrs Hobler, 141 Hyde Street, Nth Rockhampton, Qld, 4701.

KENWOOD TS520, 240 V AC/12 V DC, SP520, handbook, mic set new spare valves (3) — $480. TV506 6 m transverter complete $180. Trio comm rx 9R-59DS 550 kHz-30 MHz manual, other data $100. All good wkg order. VK4YO QTHR. Tel: (07) 376 2343.

KENWOOD TR-7400A 800 channel 2 m, 25 watts output with mounting bracket if used as mobile, $260. Keith VK4KS QTHR. Tel: (07) 353 1968.

□ FOR SALE — TAS □

ICOM ICRM$_3$ remote control scanner. Near new. Suit Icom IC-211, IC-701 or IC-245. $100. Yaesu FR-50 rx. Recently re-aligned, new valves, clean condx. Inc ext spkr $70. VK7AN QTHR. Tel: (003) 31 7914.

ANSWERS TO AOCP TRIAL EXAM

1	b	11	d	21	d	31	c	41	c
2	a	12	a	22	c	32	a	42	d
3	d	13	c	23	b	33	a	43	d
4	c	14	d	24	b	34	d	44	a
5	a	15	a	25	a	35	c	45	c
6	c	16	b	26	a	36	b	46	c
7	d	17	b	27	a	37	b	47	d
8	d	18	b	28	a	38	b	48	d
9	a	19	c	29	b	39	a	49	d
10	d	20	b	30	c	40	a	50	b

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Due to a large expansion programme, the following exciting products will become progressively available in the near future:

1 All aluminium lattice towers (guyed). The approval of the Department of Labour and Industry is expected in the near future. The computations have been done by a chartered engineering consultant.
WIDTHS 175, 250, 380, 450 mm.
MAX Hgt 25, 40, 60, 75 metres.
WEIGHTS 1.0, 1.5, 2.4, 3.5 kg/metre.
SECTIONS: Standard; 5.80, 2.90 metres. (19 ft & 9.5 ft). To fit Comet truck!
MAINTENANCE: NIL!! Due to TIG Welding by a certified operator and the use of the best available aluminium in Australia 6063-T83, the greatest strength and corrosion-resistance is guaranteed.

2 Tilt over and crank up towers . . . Early 1985.

3 Parabolic dishes at affordable prices 2, 3, 4, 5 & 6 metre diameters . . . February 85.

4 1, 2, 3, 4 & 5 element high gain beams using lattice tower for booms on 40 metres. Don't miss out on that fine DX . . . October 1984.

5 1, 2, 3 & 4 elements on 80 metres!!! . . . December 1984.

6 Log-periodics from 3.5 MHz and up . . . January 1985 13 MHz and up available now.

7 Range of highest quality BALUNS to 5 kW. 1:1, 4:1 for dipoles, inverted vees etc.

8 On special order, we can design and supply RHOMBIC ANTENNAS including towers, guys, wire, porcelain insulators, terminating non-inductive resistors etc, etc. DEBEGLASS Fibreglass guys 4 and 5 mm dia. 20% stronger than steel cable!!

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bail

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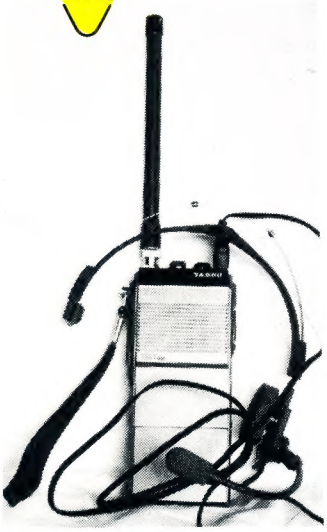
144-148 MHz

VOX operation with optional YH-2 Headset.



Thumbwheel Channel Selection.

PA-3 DC/DC Car Adapter/Trickle Charger (option)

FT209R

3.5 watt/350 mW

FT209RH

5 watt/500 mW

Microprocessor controlled
10 Memories
Reverse Repeater
Power Saver to extend battery life
VOX operation with optional YH-2 Headset

PA-3 DC/DC Car Adapter/Trickle Charger (option)

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100 watts Output PEP/DC — 25 watts AM Carrier — 13.4 volts DC (19 amps for 100 watts output) — Weight 4.5 kg

FEATURES:

- *Dual VFOs and eight memories*
- *Programmable Memory Scanning*
- *SSB AM-FM Modes Standard*
- *Squelch on all Modes*
- *Full Break-in CW*
- *Accessories installed include 600Hz CW Filter, iambic keyer with dot-dash memory, marker, IF shift and width. N.B. (only option is CAT interface to extended computer control)*
- *High performance General Coverage Receiver*

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